



U.S. Department of the Interior  
Bureau of Land Management

---

# Environmental Assessment

## DOI-BLM-WY-0000-2020-0010-EA

2020 Fourth Quarter Competitive Lease Sale

---

Bureau of Land Management  
Wyoming State Office  
5353 Yellowstone Dr.  
Cheyenne, Wyoming 82009

BLM e-Planning link:

The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

DOI-BLM-WY-0000-2020-0010-EA

**BLM Wyoming  
Fourth Quarter Competitive Oil and Gas Lease Sale  
Table of Contents**

**DOI-BLM-WY-0000-2020-0010-EA**

## Table of Contents

1.1 Introduction .....	<del>710</del>
1.2 Background.....	<del>912</del>
1.3 Purpose and Need .....	<del>912</del>
1.3.1 Decisions to Be Made.....	<del>912</del>
1.4 Tiering and Conformance with BLM Land Use Plans and Other Environmental Assessments .....	<del>1013</del>
1.5 Relationship to Statutes, Regulations, and Other Plans or Decisions .....	<del>1114</del>
1.6 Scoping .....	<del>1214</del>
1.7 Public Participation .....	<del>1215</del>
1.8 National Forest System Lands – Thunder Basin National Grasslands.....	<del>1215</del>
2.0 Description of Alternatives, Including Proposed Action .....	<del>1316</del>
2.1 Introduction .....	<del>1316</del>
2.2 No Action Alternative .....	<del>1316</del>
2.3 Proposed Action Alternative .....	<del>1316</del>
2.4 Alternatives Considered and Eliminated from Further Analysis .....	<del>1619</del>
3.0 Affected Environment.....	<del>1720</del>
3.1 Introduction .....	<del>1720</del>
3.2 RMP Special Designations .....	<del>1720</del>
3.2.1 Wilderness and Wilderness Study Areas.....	<del>1720</del>
3.2.2 Lands with Wilderness Characteristics (LWCs) .....	<del>1720</del>
3.2.3 Areas of Critical Environmental Concern (ACECs) .....	<del>1821</del>
3.2.4 <i>Special Management Areas (SMAs)</i> .....	<del>1821</del>
3.3 Air Resources .....	<del>1821</del>
3.3.1 Air Quality .....	<del>1821</del>
3.4 Climate .....	<del>1821</del>
3.4.1 Climate Change .....	<del>1922</del>
3.4.2 Greenhouse Gas Emissions .....	<del>1922</del>
3.5 Geology and Mineral Resources.....	<del>1922</del>
3.6 Master Leasing Plans (MLPs) .....	<del>1922</del>

3.7	Designated Development Areas (DDAs)/Oil and Gas Management Areas .....	<u>1922</u>
3.8	Soils .....	<u>1922</u>
3.9	Solid and Hazardous Wastes .....	<u>2023</u>
3.10	Water Resources .....	<u>2023</u>
3.11	Vegetation.....	<u>2124</u>
3.12	Livestock Grazing/Wild Horses .....	<u>2124</u>
3.13	Wildlife, Fish, and Special Status Species (Plants and Animals).....	<u>2124</u>
3.13.1	Special Status Species .....	<u>2124</u>
3.13.2	Greater Sage-grouse .....	<u>2225</u>
3.13.3	Big Game.....	<u>2225</u>
3.14	Cultural and Heritage Resources, Including Paleontology, Traditional Cultural Properties, and Historic Trails .....	<u>2225</u>
3.15	Recreation.....	<u>2225</u>
3.16	Visual Resource Management (VRM) .....	<u>2225</u>
3.17	Socioeconomics, Environmental Justice, and Public Health and Safety.....	<u>2326</u>
3.17.1	Socioeconomics .....	<u>2326</u>
3.17.2	Environmental Justice .....	<u>2427</u>
3.17.3	Public Health and Safety .....	<u>2528</u>
4.0	Impact Analysis.....	<u>2528</u>
4.1	No Action Alternative.....	<u>2629</u>
4.1.1	Socioeconomics .....	<u>2629</u>
4.2	Proposed Action Alternative.....	<u>2629</u>
4.3	RMP Special Designations .....	<u>2730</u>
4.4	Air Resources.....	<u>2730</u>
4.4.1	Air Quality .....	<u>2730</u>
4.5	Greenhouse Gas Emissions and Climate Change.....	<u>2730</u>
4.5.1	Direct Emissions .....	<u>2730</u>
4.5.2	Indirect Emissions .....	<u>2730</u>
4.5.3	Uncertainty .....	<u>2730</u>
4.5.4	Climate Change Impacts.....	<u>2730</u>
4.5.5	Mitigation of Impacts from GHG Emissions and Climate Change Impacts .....	<u>2730</u>
4.6	Geology and Mineral Resources.....	<u>2831</u>
4.7	Master Leasing Plan (MLP) Areas .....	<u>2831</u>
4.8	Soils .....	<u>2831</u>
4.9	Solid and Hazardous Wastes .....	<u>2932</u>

4.10	Water Resources .....	<u>2932</u>
4.11	Vegetation.....	<u>3235</u>
4.12	Wildlife, Fish, and Special Status Species (Plants and Animals).....	<u>3336</u>
4.12.1	Special Status Species .....	<u>3336</u>
4.12.2	Greater Sage-grouse .....	<u>3437</u>
4.12.3	Big Game.....	<u>3437</u>
4.13	Cultural and Heritage Resources, Including Paleontology, Traditional Cultural Properties, and Historic Trails .....	<u>3437</u>
4.14	Recreation.....	<u>3538</u>
4.15	Visual Resource Management (VRM) .....	<u>3639</u>
4.16	Socioeconomics, Environmental Justice, and Public Health and Safety.....	<u>3639</u>
4.16.1	<i>Socioeconomics</i> .....	<u>3639</u>
4.16.2	<i>Environmental Justice</i> .....	<u>3740</u>
4.16.3	<i>Public Health and Safety</i> .....	<u>3740</u>
4.17	Cumulative Impacts.....	<u>3740</u>
4.17.1	Greater Sage-grouse.....	<u>3841</u>
4.17.2	Big Game.....	<u>3841</u>
4.17.3	Greenhouse Gas Emissions.....	<u>3841</u>
5.0	Appendices.....	<u>3942</u>
5.1	Air Resources .....	<u>4043</u>
5.1.1	Air Quality – Affected Environment.....	<u>4043</u>
5.1.2	Climate – Affected Environment.....	<u>5052</u>
5.1.3	Air Quality – Environmental Impacts .....	<u>6567</u>
5.1.4	Greenhouse Gas Emissions and Climate Change – Environmental Impacts .....	<u>6668</u>
5.1.5	Uncertainty .....	<u>7274</u>
5.1.6	Climate Change Impacts.....	<u>7476</u>
5.1.7	Mitigation of Impacts from GHG Emissions and Climate Change Impacts .....	<u>7577</u>
5.1.8	<i>Greenhouse Gas Emissions – Cumulative Impacts</i> .....	<u>7678</u>
5.2	Greater Sage Grouse.....	<u>8991</u>
5.2.1	Greater Sage-grouse - Affected Environment .....	<u>8991</u>
5.2.2	Greater Sage-grouse - Environmental Impacts.....	<u>9698</u>
5.2.3	Greater Sage-grouse - Cumulative Impacts.....	<u>9698</u>
5.3	Big Game.....	<u>9799</u>
5.3.1	Big Game – Affected Environment.....	<u>9799</u>
5.3.2	Big Game – Environmental Impacts .....	<u>102104</u>

5.3.3 Big Game – Cumulative Impacts .....	<del>104</del> <u>106</u>
5.4 Lease Sale Parcel List with Proposed Stipulations and Noted Deletions/Deferrals	<del>107</del> <u>109</u>
5.4.1 Lease Stipulation Code Index.....	<del>136</del> <u>138</u>
5.5 Parcel Resource Values/Stipulations Summary Table .....	<del>152</del> <u>153</u>
5.6 Air Resources Appendix: Air Quality Related Values: Visibility, Hazardous Air Pollutants and Deposition .....	<del>159</del> <u>160</u>
5.6.1 Visibility –Wyoming .....	<del>159</del> <u>160</u>
5.6.2 Hazardous Air Pollutants (HAPs)-High Desert District.....	<del>163</del> <u>164</u>
5.6.3 Deposition and Lake Chemistry – Wyoming .....	<del>164</del> <u>165</u>
5.7 Wildlife Habitat Maps .....	<del>174</del> <u>175</u>
5.8 Lands with Wilderness Characteristics (LWCs) Review .....	<del>182</del> <u>183</u>
5.9 Hydraulic Fracturing White Paper (July 5, 2013) .....	<del>189</del> <u>190</u>
5.10 EA Preparers/Reviewers, Consultation & Coordination .....	<del>198</del> <u>199</u>
5.10.1 Outside Agencies or Individuals .....	<del>198</del> <u>199</u>
5.10.2 BLM-Wyoming State Office.....	<del>198</del> <u>199</u>
5.10.3 BLM-High Desert District.....	<del>199</del> <u>200</u>
5.10.4 BLM High Plains District .....	<del>199</del> <u>200</u>
5.10.5 BLM-Wind River/Bighorn Basin District .....	<del>200</del> <u>201</u>
5.11 References .....	<del>201</del> <u>202</u>

## **1.0 Introduction**

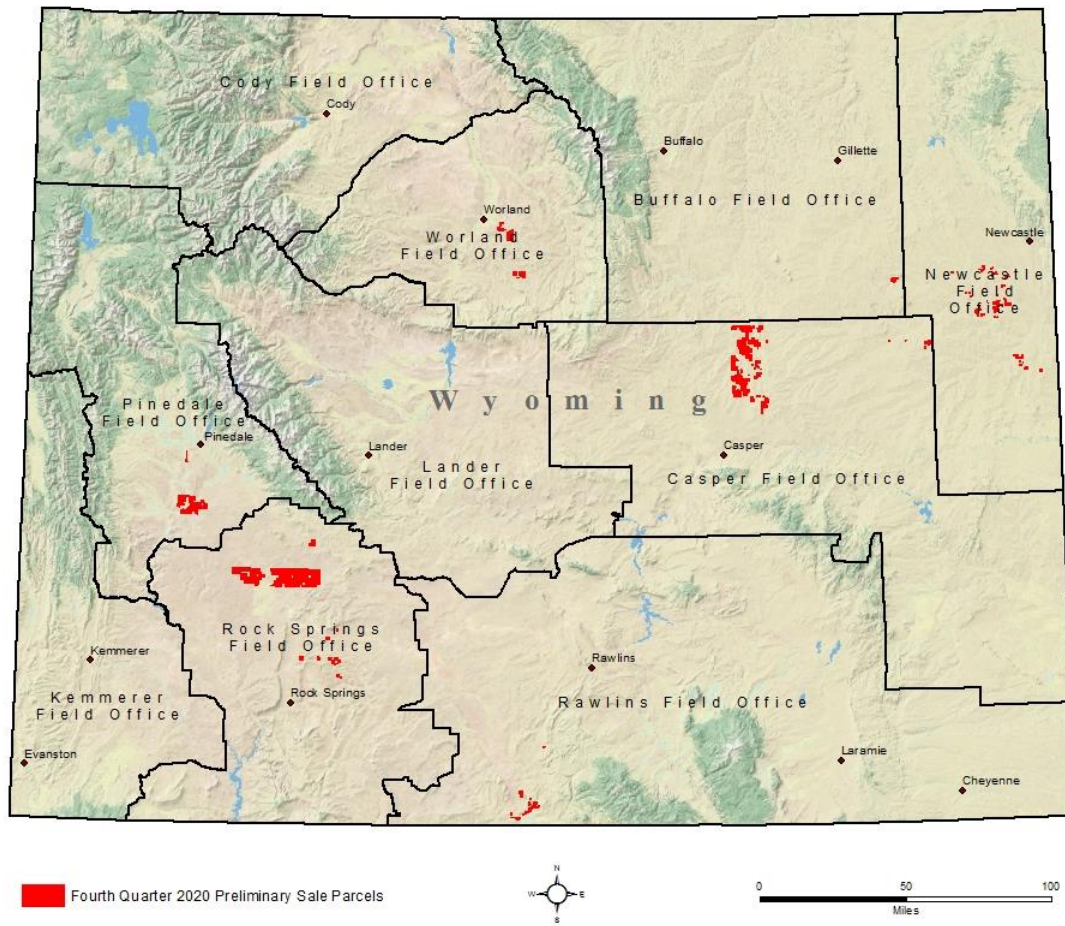
### **1.1 Introduction**

In accordance with the Mineral Leasing Act of 1920, as amended [30 U.S.C. § 181 et seq.], Federal Onshore Oil & Gas Leasing Reform Act of 1987 [30 U.S.C. § 181 et seq.] and Title 43 Code of Federal Regulations (CFR) 3120.1-2(a), the BLM Wyoming State Office (WSO) conducts a quarterly competitive oil and gas lease sale for lands that are eligible and available for leasing. A Notice of Competitive Oil and Gas Lease Sale (Sale Notice), which lists parcels to be offered at the auction, was published by the WSO at least 45 days before each of the subject auction dates. Applicable lease stipulations for each parcel were identified in the Sale Notices. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary is made during the BLM's land use planning process in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA) [43 U.S.C. § 1712]. Surface management/use for mineral extraction on non-BLM administered surface overlying Federal minerals is determined by the BLM in consultation with the appropriate surface management agency or the private surface owner when surface use is proposed by the leaseholder or its designated operator.

After the end of the nomination period, the WSO prepared a draft list of lease sale parcels (the "preliminary parcel list") for this portion of the sale. The WSO submitted the draft list of lease sale parcels to the applicable BLM field and district offices for initial review and processing. Interdisciplinary Teams (IDTs) in each field office, in coordination with their district office, have reviewed the parcels to determine 1) if they are located in areas open to leasing under the approved RMP; 2) the appropriate stipulations required under the approved RMP; 3) whether new information or changed circumstances are present since the land use plan was approved; 4) necessary coordination requirements with other Federal or State agencies; and 5) if there are special conditions of which potential bidders should be made aware. The IDT relied on personal knowledge of the areas involved and reviewed existing databases (including Geographic Information System (GIS) data and digital aerial imagery) and file information to determine the appropriate stipulations. Where the BLM personnel determined field visits were necessary, field visits were made to those parcels where the BLM had legal access; results of any on site visit is documented in the administrative record. No parcels analyzed in this EA required additional site visitation.

This Environmental Assessment (EA) has been prepared to document compliance with NEPA including disclosure of the anticipated impacts of leasing and development of the proposed parcels, to the extent reasonably foreseeable.

**Map 1. All Nominated Parcels 2020 Fourth Quarter Competitive Lease Sale**



## **1.2 Background**

BLM is responsible for oil and gas leasing on about 700 million acres of BLM, national forest, and other Federal lands, and seeks to ensure that mineral resources are developed in an environmentally responsible manner.

In accordance with the MLA and 43 CFR § 3120.1-2, the BLM WSO conducts quarterly competitive oil and gas lease sales for lands that are eligible and available. Private individuals or entities may file Expressions of Interest (EOIs) to suggest parcels for consideration for leasing by the BLM. The authorized officer also may identify lands for leasing consideration. Additional information on the competitive lease sale process is available on-line at: <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing>

The offering and subsequent issuance of oil and gas leases, in and of itself, does not cause or directly result in any surface disturbance. The BLM cannot determine, prior to conducting a lease sale, whether a proposed parcel actually will be leased, or if it is subsequently leased, whether the lease will be explored or developed.

Once a parcel is sold and the lease is issued, the lessee has the right to use the leased lands to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease, restrictions derived from specific nondiscretionary statutes, and other reasonable measures to minimize adverse impacts (see 43 § CFR 3101.1-2). Further, relevant regulations at 43 CFR § 3162.5-1(a) provide: “The operator shall conduct operations in a manner which protects the mineral resources, other natural resources, and environmental quality. In that respect, the operator shall comply with the pertinent orders of the authorized officer and other standards and procedures as set forth in the applicable laws, regulations, lease terms and conditions, and the approved drilling plan or subsequent operations plan. Before approving any Application for Permit to Drill submitted pursuant to § 3162.3-1 of this title, or other plan requiring environmental review, the authorized officer shall prepare an environmental record of review or an environmental assessment, as appropriate. These environmental documents will be used in determining whether or not an environmental impact statement is required and in determining any appropriate terms and conditions of approval of the submitted plan.” Accordingly, the BLM can subject development of existing leases to reasonable conditions to minimize impacts to other resources, through the application of COAs at the time of permitting. Any constraints must conform with the applicable land use plan and be consistent with rights granted to the holder under the lease. In addition, upon cessation of lease operations, the lessee must plug the well(s) and abandon any facilities on the lease. The surface must also be reclaimed to the satisfaction of the BLM authorized officer, in accordance with the MLA, Section 17g [30 U.S.C. § 226(g)].

Oil and gas leases are issued for a 10-year period and continue for so long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil or gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease, the lease may terminate or be cancelled, and BLM may consider offering the lands for lease at another lease sale after a new review process.

## **1.3 Purpose and Need**

It is the policy of the BLM as derived from various laws, including the Mineral Leasing Act of 1920, as amended (MLA) and the Federal Land Policy and Management Act of 1976 (FLPMA) to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. Continued sale and issuance of lease parcels in conformance with the approved Resource Management Plans (RMPs) would allow for continued production of oil and gas from public lands and reserves.

The need is to respond to Expressions of Interest, as established by the Federal Onshore Oil & Gas Leasing Reform Act of 1987 (FOOGLRA), MLA, and FLPMA.

### **1.3.1 Decisions to Be Made**

BLM will decide, based on this analysis, whether to offer parcels for lease and what stipulations will be placed on those parcels, in conformance with the approved RMPs.

#### **1.4 Tiering and Conformance with BLM Land Use Plans and Other Environmental Assessments**

Pursuant to 40 CFR § 1508.28 and § 1502.21, this EA tiers to the Final Environmental Impacts Statements (FEISs) prepared for each Field Office (FO) Resource Management Plan (RMP), and any subsequent amendments or updates, and incorporates by reference the relevant portions of the FEISs. The impacts analysis in the FEISs for the effects from oil and gas leasing and development incorporates the Reasonably Foreseeable Development (RFD) scenarios (i.e., the level of oil and gas development projected for the life of the plan based on historically and projected trends).

The sale and issuance of the leases conforms to the approved RMPs (43 CFR § 1610.5) and Records of Decision (RODs) for the applicable planning areas, as amended or updated, including:

##### **High Plains District (HPD)**

The Casper Field Office (CFO) RMP ROD approved on December 7, 2007 (supported by June 2007 FEIS), as amended by the Record of Decision and Bureau of Land Management Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs Field Offices Approved Resource Management Plan Amendment (ARMPA) for Greater Sage-Grouse approved on September 21, 2015 (supported by May 2015 FEIS).

The Newcastle Field Office (NFO) RMP ROD approved on August 25, 2000 (supported by June 1999 FEIS), as amended by the ARMPA (supported by May 2015 FEIS).

The Buffalo Field Office (BFO) Buffalo/Rocky Mountain Region RMP ROD approved on September 21, 2015 (supported by May 2015 FEIS), as amended by the Buffalo Field Office Record of Decision and Approved Resource Management Plan Amendment (November 22, 2019).

##### **Wind River/Bighorn Basin District (WR/BBD)**

The Lander Field Office (LFO) RMP ROD signed on June 26, 2014 (supported by February 2013 FEIS), as amended by the ARMPA (supported by May 2015 and FEIS).

The Cody Field Office (CYFO) Bighorn Basin/Rocky Mountain Region RMP ROD approved on September 21, 2015 (supported by May 2015 FEIS).

The Worland Field Office (WFO) Bighorn Basin/Rocky Mountain Region RMP ROD approved on September 21, 2015 (supported by May 2015 FEIS).

##### **High Desert District (HDD)**

The Rawlins Field Office (RFO) RMP ROD approved on December 24, 2008 (supported by January 2008 FEIS) as amended by the ARMPA (supported by May 2015 FEIS).

The Green River (Rock Springs Field Office (RSFO)) RMP ROD approved on August 8, 1997 (supported by April 1996 FEIS), as amended by the ARMPA (supported by May 2015 FEIS).

The Pinedale Field Office (PFO) RMP ROD approved on November 26, 2008 (supported by August 2008 FEIS), as amended by the ARMPA (supported by May 2015 FEIS).

The Kemmerer Field Office (KFO) RMP ROD approved on May 24, 2010 (supported by August 2008 FEIS), as amended by the ARMPA (supported by May 2015 FEIS)

The FO RMPs include allocation decisions which identify lands as either open or closed to fluid mineral leasing, and (if open) provide stipulations that are attached to new leases to mitigate effects of potential development operations.

This EA discloses the affected environment, as well as the anticipated reasonably-foreseeable GHG emissions' related impacts of leasing and development, and potential mitigation of those impacts. The EA provides information for BLM to determine whether this project would have significant impacts not already disclosed and analyzed in other NEPA documents, warranting an EIS. The RMP EISs have already evaluated potentially significant impacts arising from the BLM's land use planning decisions. See 43 CFR § 46.140(c). Based on this EA, the BLM may issue a "finding of no significant impacts" (FONSI), if no significant impacts are identified. If a FONSI is reached,

a Decision Record (DR) may be signed approving the selected alternative, which could be the proposed action, the no-action alternative, or a combination thereof.

### 1.5 Relationship to Statutes, Regulations, and Other Plans or Decisions

The proposed action and alternatives are consistent with other plans, programs, and policies of other federal agencies, the State of Wyoming, local governments, and affected Tribes, to the extent practical, including but not limited to the following:

Federal Land Policy and Management Act of 1976, as amended [43 U.S. Code § 1701 et seq.]  
Mineral Leasing Act of 1920, as amended [30 U.S.C. § 181 et seq.]  
Federal Onshore Oil & Gas Leasing Reform Act of 1987 [30 U.S.C. § 181 et seq.]  
The National Environmental Policy Act [42 U.S.C. 4321 et seq.]  
Clean Air Act [42 U.S.C. § 1857 et seq.], as amended and recodified [42 U.S.C. § 7401 et seq.]  
Clean Water Act [33 U.S.C. § 1251 et seq.]  
Endangered Species Act [16 U.S.C. § 1531 et seq.]  
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations  
Migratory Bird Treaty Act [16 U.S.C. § 703 et seq.]  
National Trails Systems Act [16 U.S.C. § 1241 et seq.]  
National Landscape Conservation System Act [16 U.S.C. § 7202]  
National Historic Preservation Act of 1966, as amended [54 U.S.C. § 300101 et seq.]  
Protection of Historic Properties (36 CFR § 800)  
Native American Graves Protection and Repatriation Act of 1990 [25 U.S.C. § 3001 et seq.] and 43 CFR § 10  
American Indian Religious Freedom Act of 1978 [42 U.S.C. 1996]  
Native American Trust Resource Policy standards are presented in the Department of the Interior Comprehensive Trust Management Plan dated March 28, 2003  
Wild and Scenic Rivers Act of 1968, as amended [16 U.S.C. § 1271 et seq.]  
Bald and Golden Eagle Protection Act of 1940, as amended [16 U.S.C. § 668 et seq.]  
Paleontological Resources Preservation Act of 2009 [16 U.S.C. § 470aaa et seq.]  
Greater Sage-grouse Record of Decision and Land Use Plan Amendments for Northwest Colorado and Wyoming, 2015 (United States Department of Agriculture, Forest Service)  
USFS Supplemental Information Report to the Biological Assessment and Evaluation for Revised Land and Resource Management Plans and Associated Oil and Gas Leasing Decisions, 2018

In an opinion and amended order on March 26, 2018, the U.S. District Court for the District of Montana found that the BLM violated NEPA in the Final EISs for the Buffalo and Miles City RMPs (*Western Organization of Resource Councils et al. v. BLM*). The Court found:

1. “NEPA requires BLM to conduct new coal screening and consider climate change impacts to make a reasoned decision on the amount of recoverable coal made available in the RMPs.” (Order at page 46);
2. “BLM must supplement the [RMP FEISs] with an analysis of the environmental consequences of downstream combustion of coal, oil, and gas open to development under each RMP.” (Order at page 47); and
3. “BLM violated NEPA where it failed to justify its use of [Global Warming Potentials, or GWPs] based on a 100-year time horizon rather than the 20-year time horizon of the RMPs. BLM also violated NEPA where it failed to acknowledge evolving science in this area in the Buffalo PRMP and FEIS.” (Order at page 48).

The Court ordered the BLM to comply with these findings “at the lease-level and permit-level for any pending or future coal, oil, or gas developments in the Buffalo RMP and the Miles City RMP until BLM produces the supplemental environmental analyses for the Buffalo RMP and Miles City RMP that comply with NEPA and the APA.” The BLM believes that the proposed Fourth Quarter 2020 competitive oil and gas lease sale complies with the Court’s order by satisfactorily addressing these issues in this EA (see sections 3.3.9 and 4.2.2.2 addressing “Greenhouse Gas Emissions and Climate” including estimates and discussion relating to downstream combustion of oil and gas, and discussion on GWPs).

## **1.6 Scoping**

In order to identify preliminary issues for analysis (see the BLM's NEPA Handbook H-1790-1 at page 41), the BLM conducted internal scoping. The BLM personnel listed in Appendix 5.10 provided information and input for this EA. Through the BLM's internal scoping, and in light of the numerous EAs the BLM has prepared for oil and gas lease sales in Wyoming, this EA will not analyze issues that are already satisfactorily addressed in the RMP FEISs, to which it tiers.

BLM Wyoming personnel also conferred with the Wyoming Game and Fish Department (WGFD) in accordance with an interagency Memorandum of Understanding.

## **1.7 Public Participation**

Formal public participation was initiated when this EA was entered into the BLM-Wyoming e-Planning database on August 14, 2020. A news release was issued on August 14, 2020 notifying the public that this EA is being posted on the BLM Wyoming website for a 30-calendar day public comment period. As required by BLM leasing policies, where parcels include split estate lands, a notification letter was sent to the surface owner(s) identified by the party submitting the EOI. These letters were sent by the Wyoming State Office (WSO).

All substantive comments on the EA will be reviewed and addressed before the BLM reaches its decision.

## **1.8 National Forest System Lands – Thunder Basin National Grasslands**

The 204Q sale includes 24 parcels (12,933.57 acres) of lands that are administered by the U.S. Department of Agriculture – Forest Service (USFS). In accordance with each agency's regulations and consistent with the BLM-USFS Memorandum of Understanding (MOU),<sup>1</sup> the USFS has provided consent to lease these lands with applicable stipulations that they have provided to the BLM.

---

<sup>1</sup> See BLM MOU W0300-2006-07, "Memorandum of Understanding Between [BLM] and [USFS] Concerning Oil and Gas Leasing and Operations." Effective April 14, 2006.

## 2.0 Description of Alternatives, Including Proposed Action

### 2.1 Introduction

In June 2020, a preliminary parcel list of 128 parcels (comprised of approximately 184,702.49 acres) was prepared by the WSO and sent to the applicable field and district offices for review.

Five parcels (Parcels 742, 743, 825, 828, ~~and 6962, and 6961~~) have been deleted in full from this sale because they were located within areas closed to new oil and gas leasing in the PFO. An addition nine parcels (750, 817, 819, 820, 821, 823, 824, 827, 6960, and 6961) have been deleted in part from this sale because they are in areas closed to leasing. Total acres deleted from this sale is 20,695.950. The parcel and portions of parcels deleted from this sale will not be considered further. These parcels are described in Appendix 5.4.

Three parcels have been deferred 757 and 763 in full from this sale because BLM is working with current operators to plug wellbores and 819 and part of 824 are deferred in order to complete Tribal consultation prior to leasing.

As a result, the remaining 120 parcels or portions of parcels (comprised of 160,820.75 acres) are available for lease and are addressed in the alternatives, below.

20204Q Nominations:

Field Office	Acres NOMINATED	# of Parcel Nominations	NUMBER DELETE WHOLE (acres)	NUMBER DELETE PART (acres)
BFO	1,396.61	1	0	0
CFO	52,712.28	35	2 (2,960.00)	1 (320.00)
NFO	12,672.55	22	0	0
CYFO	0	0	0	0
LFO	0	0	0	0
WFO	83,59.37	7	0	0
KFO	0	0	0	0
PFO	20,824.46	13	3 (5,160.00)	9 ( 9,735.95)
RFO	5,903.24	8	0	0
RSFO	82,833.98	42	0	0
Totals	184,702.49	128	5 (8,120.00)	4 (10,055.950)

### 2.2 No Action Alternative

Under the No Action Alternative, BLM Wyoming would not offer 128 parcels nominated and located in areas open to leasing under the approved RMPs, containing approximately 184,702.49 acres. This would mean that the Expressions of Interest would be rejected and no lease parcels would be offered. Choosing the No Action alternative would not prevent future leasing in these areas consistent with land use planning decisions and subject to appropriate stipulations, identified in the respective land use plans. Foregoing offering these lands could constrain local supplies and affect expected income in the form of royalty payments from production of the Federal minerals.

### 2.3 Proposed Action Alternative

Under the Proposed Action Alternative, 120 parcels, containing approximately 163,340.750 acres, were evaluated and are to oil and gas leasing under the applicable RMP RODs, as amended, including the Record of Decision and Bureau of Land Management Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs Field Offices Approved Resource Management Plan Amendment for Greater Sage-Grouse (ARMPA) for Greater Sage-grouse (September 21, 2015).

The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary is made during the land use planning process. Surface management/use for mineral extraction on non-BLM administered land overlaying federal minerals will be determined by the BLM in consultation with the appropriate surface management agency or the private surface owner at the time such surface use is proposed by the leaseholder or designated agent. Under the MLA, issuing oil and gas leases is a discretionary authority conveyed to the Secretary of the Interior. In accordance with this discretionary authority and as described below, certain parcels would be available for offer at the Fourth Quarter 2020 competitive lease sale, and others are deferred by State Director (SD) discretion. The Proposed Action alternative removes from consideration those parcels, detailed below, that will be deferred from sale for the reasons identified below.

Following review of the subject parcels, three whole parcels and portions of one parcel would be deferred as detailed in the table below and in Appendix 5.4. Approximately 3,185.79 acres are proposed for deferral under the Proposed Action.

Specific to the deferrals, parcels 819 and portions of 824 (located in PFO) are deferred until Tribal Consultation can be completed. Parcels 757 and 763 (located in WFO) are deferred until well plugging can be verified.

Summary of parcels deferred, deleted, and available for sale:

	NOMINATED ACREAGE	PARCEL COUNT	WHOLE DEFERRALS (ACRES)	PARTIAL DEFER (ACRES)	DELETE WHOLE (ACRES)	DELETE PART (ACRES)	PARCELS OFFERED	ACREAGE OFFERED
BFO	13,96.610	1	0.00	0.00	0.00	0.00	9	1,396.610
CFO	52,712.280	35			2 (2,960.00)	1 (320.00)	32	49,432.280
NFO	12,672.550	22	0.00	0.00	0.00	0.00	22	12,672.550
CYFO	0	0	0.00	0.00	0.00	0.00	0	0
WFO	8,359.370	7	2 (2,315.10)	0.00	0.00	0.00	7	6,044.27
KFO	0	0	0.00	0.00	0.00	0.00	0	0
PFO	20,824.460	13	1 (640.00)	1 (230.69)	3 (5,160.00)	9 (9,735.95)	4	2,537.820
RFO	5,903.240	8	0.00	0.00	0.00	0.00	6	5,903.240
RSFO	82,833.980	42	0.00	0.00	0.00	0.00	6	82,833.980
LFO	0	0	0	0	0	0	0	0
<b>TOTALS</b>	<b>184,702.490</b>	<b>128</b>	<b>3 (2,955.100)</b>	<b>1 (230.69)</b>	<b>5 (8,120.00)</b>	<b>10 (12,575.95)</b>	<b>120</b>	<b>160,820.750</b>

Through additional review the parcels in the following table have been deferred in CFO, PFO, RFO, RSFO, and WFO because of their location within Greater Sage-Grouse Priority Habitat Management Area (PHMA). The following table lists the parcels that have been deferred because of PHMA.

Parcels deferred in PHMA:

CFO	PFO	RFO	RSFO	WFO
741	820	755	774	761
750	821		775	762
768	6879		776	764
769			777	6931
770			778	
795			779	

6919			788	
6924			790	
6928			791	
6934			794	
6939			798	
			799	
			801	
			803	
			805	
			806	
			807	
			809	
			810	
			812	
			813	
			814	
			815	
			816	
			6935	
			6936	
			6937	
			6938	
			6940	
			6949	
			6950	
			6951	
			6952	
			6953	
			6954	
			6955	
			6956	
			6957	
			6958	
			6959	

Under the Proposed Action Alternative, 61 parcels containing approximately 63,313.420 acres would be offered for lease during the Fourth Quarter (December) 2020 (204Q) Competitive Lease Sale.

## **2.4 Alternatives Considered and Eliminated from Further Analysis**

### **Offer All Parcels Subject to Standard Lease Terms and Conditions**

Offering all nominated parcels with only the standard lease terms and conditions on the BLM's lease form was considered as a means to reduce constraints to oil and gas development on public lands. Such an alternative is not in conformance with the approved RMPs where the applicable RMP prescribes stipulations in accordance with FLMPA's Section 102(a)(8) mandate to manage the public lands to protect resource values. Therefore, this alternative was not analyzed in detail.

### **Offer All Parcels Subject to Original Expression of Interest**

An alternative was considered that would offer all parcels as they were originally nominated through the Expression of Interest. This alternative was not carried forward for detailed analysis because it would result in the offering of parcels in areas currently closed to leasing. This alternative would not be in conformance with the approved RMPs.

### **Offer All Parcels Subject to No Surface Occupancy (NSO) Stipulations**

An alternative was considered that would offer all parcels located in areas open to leasing with a NSO stipulation. This alternative was not carried forward to detailed analysis because it is not in conformance with the approved RMPs and would only prohibit surface occupancy for oil and gas development; other non-oil and gas occupancy may not be similarly constrained. This alternative would unnecessarily limit oil and gas occupancy in areas where the approved RMPs have determined that less restrictive stipulations would adequately mitigate the anticipated impacts under our mandate of multiple-use and sustained yield.

### **Defer All Parcels Located in Greater Sage-grouse Habitats**

An additional alternative was considered but not analyzed in detail which would defer offering all parcels located within Greater Sage-grouse Priority Habitat Management Areas (PHMAs) and/or General Habitat Management Areas (GHMAs). This alternative was not analyzed in detail because it would not be in conformance with the approved RMPs. Further, this alternative would effectively, if temporarily, close areas to oil and gas leasing and development where the field office RMPs have determined that these lands are open to leasing with applicable stipulations to conserve Greater Sage-grouse and their habitats.

### **3.0 Affected Environment**

#### **3.1 Introduction**

This section describes the present conditions of various environmental resources that could be affected under the action alternatives, if lands are leased, and if oil and gas exploration and development operations are eventually authorized by the BLM. Descriptions of the affected environment in this section focus on the relevant major resources or issues.

For a complete and detailed description of the affected environment, please refer to the applicable RMP FEISs.

#### **3.2 RMP Special Designations**

##### **3.2.1 Wilderness and Wilderness Study Areas**

Wilderness Study Areas (WSAs) are managed according to a non-impairment standard. Under this standard, these lands are managed in a manner so as not to impair the suitability of such areas for preservation as wilderness. At present, the BLM manages these lands in accordance with the approved RMPs and the Interim Management Policy for Lands Under Wilderness Review until Congress either designates each WSA as “wilderness” or releases it from consideration and the land reverts to multiple-use management. None of the parcels carried forward for analysis in this sale are located within a WSA. The closest parcel to any of the WSAs is WY-204Q-0762 which is approximately 3.7 miles west of Honeycombs WSA.

##### **3.2.2 Lands with Wilderness Characteristics (LWCs)**

Wilderness characteristics are resource values that include naturalness, outstanding opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations of sufficient size (typically greater than 5,000 contiguous acres) to be practical to manage for these characteristics.

The BLM Land Use Planning Handbook (H-1601-1) states that the BLM must consider the management of lands with wilderness characteristics during the land use planning process. The criteria used to identify these lands are essentially the same criteria used for determining wilderness characteristics for WSAs. However, the authority set forth in Section 603(a) of FLPMA to complete the three-part wilderness review process (inventory, study, and report to Congress) expired on October 21, 1993; therefore, FLPMA does not apply to new WSA proposals and consideration of new WSA proposals on BLM-administered public lands is no longer valid. The BLM is still required under Section 201 of FLPMA to “...maintain on a continuing basis an inventory of all public lands and their resource and other values....” This includes reviewing lands to determine if they possess wilderness characteristics (see Appendix 5.8).

These parcels qualify as LWCs because they are within units which contain at least 5000 contiguous acres of roadless lands, the imprint of man’s work is substantially unnoticeable, they have outstanding opportunity for solitude or primitive recreation and they contain natural features of scientific, education, scenic or historical value. The remaining parcels were not found to contain LWCs. If a parcel is not within a 5000 acre area, they are not reviewed further in accordance with BLM policy contained in Manual 6310. Those parcels which have been determined to have lands with wilderness characteristics are available for oil and gas development under their respective RMPs.

Eighteen parcels (762, 764, 788, 798, 806, 807, 809, 810, 817, 819, 823, 825, 827, 828, 6949, 6950, 6960, and 6962) are located, either wholly or partially, within LWC areas. There are no parcels in the Citizen Proposed Wilderness (CWP) areas.

### 3.2.3 Areas of Critical Environmental Concern (ACECs)

Parcels offered for sale are subject to the stipulations shown in Appendix 5.4, which includes protecting the relevant and important ACEC values. Parcel 755 is located within the Sand Hills/JO Ranch AECE. Parcels 775, 776, and 777 are located in the South Pass Historic Landscape ACEC. Parcel 779 is located in the Natural Corrals ACEC.

### 3.2.4 Special Management Areas (SMAs)

There are thirty-five parcels that intersect SMAs which are listed in the table below and are managed according to the respective RMP.

Parcels within SMAs:

<b>Jack Morrow Hills</b>	<b>Muddy Creek Watershed</b>	<b>Red Desert Watershed</b>	<b>Ross Butte</b>	<b>Sand Hills</b>	<b>Steamboat Mountain</b>	<b>Wind River Front</b>
775	755	6935	817	742	6935	791
776	759		819	743		
777	760		823	750		
778	6224		825			
790	6732		827			
794	6932		828			
798			6960			
799			6962			
809						
810						
6935						
6936						
6937						
6938						
6940						
6949						
6950						

## 3.3 Air Resources

See Appendix 5.1 for Air Resources.

### 3.3.1 Air Quality

See Appendix 5.1.1 for Air Quality.

## 3.4 Climate

See Appendix 5.1.2 for Climate

### **3.4.1 Climate Change**

See Appendix 5.1.2.1 for Climate Change

### **3.4.2 Greenhouse Gas Emissions**

See Appendix 5.1.2.2 for Greenhouse Gas Emissions

## **3.5 Geology and Mineral Resources**

None of the parcels are located within active coal leases. In addition, none of the parcels have active gravel pits or commercial rock quarries within their boundaries and none are located within a Known Sodium Lease Area.

Two parcels (0757 and 0761) do have active bentonite mining occurring within their boundaries.

Two parcels (0734 and 6917) are located within the Draft Converse County Oil and Gas Project area in CFO; five parcels (0734, 0738, 0741, 6916 and 6917) are within the Powder River Basin Oil and Gas Project area (BFO and CFO). One parcel (6224) is located within the approved Continental Divide-Creston (CD-C) Natural Gas Project area; two parcels (0755 and 6732) are located within the existing Atlantic Rim Natural Gas Project; and one parcel is located within the South Baggs Natural Gas Developments Project area in the RFO. Three parcels (0817, 6879 and 6960) are within the Pinedale Anticline Oil and Gas Exploration and Development Project in the PFO. All of these Project Areas have EIS and RODs. Several parcels are located adjacent to the aforementioned project areas; all other parcels proposed to be offered are located in areas that have little oil and gas development. (See Maps in Section 5.74)

## **3.6 Master Leasing Plans (MLPs)**

The RMP analysis resulted in MLP determinations for the Lander, Cody and Worland field offices. See WFO RMP Decisions 2033 – 2042 and CYFO RMP Decisions 2034-2042. As described in Section 4.2.5.2 of the BB FEIS, the inclusion of the MLP determinations place additional stipulations on oil and gas-related surface disturbances in the analysis areas for the protection of big game, recreation, geologic features, and Limited Reclamation Potential (LRP) soils. None of the parcels are located in MLP areas.

## **3.7 Designated Development Areas (DDAs)/Oil and Gas Management Areas**

Designated Development Areas and Oil and Gas Management Areas are managed primarily for oil and gas exploration and development. The CYFO RMP management decision record 2023 provides for Oil and Gas Management Areas around existing intensively developed fields, applying a 2-mile buffer from the outer boundary of an existing field, and adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute (excluding Greater Sage-Grouse PHMAs). The amount of, and densities of, development beyond the existing field conditions may require additional reclamation or offsite mitigation. Management decision record 4075 exempts Oil and Gas Management Areas from the discretionary big game seasonal timing limitation stipulations.

Parcels 0762, 0764 and 6933 are located within an Oil and Gas Management area in WFO.

## **3.8 Soils**

Soils within Wyoming are generally considered to be highly erodible from both wind and water action regardless of slope with the exception of depositional soils. Soils in Wyoming are especially dependent on vegetative cover to prevent erosion; ground cover and root systems anchor the soil, recycle nutrients, and add scarce organic matter.

Several of the parcels may contain what BLM has determined to be Limited Reclamation Potential soils (See WY IM 2012-032). Work in these areas will require detailed plans to ensure that the soils can be properly reclaimed and protected during construction and production activities.

All parcels have the potential to contain slopes greater than 25%. Lease Notice No. 1 requires that Operators avoid operations on slopes greater than 25%.

Please refer to the RMP FEISs for a more detailed description of the soil resources in the planning areas.

### **3.9 Solid and Hazardous Wastes**

None of the parcels are known to contain open sources of solid waste. Historical management of split estate lands is unknown but unlikely to contain reportable levels of hazardous waste; these lands may have been impacted through normal everyday living including but not limited to spills of oils, paints, etc.

Several parcels have been previously leased and contain well bores that have been plugged and abandoned. Parcels 046 (BFO) and 121 (RSFO) contain open well bores that have not been plugged. Any of these parcels may also contain previously approved for abandonment, oilfield materials in the subsurface; they may also contain materials that were disposed of without authorization.

BLM will work with the existing liable partner, and the new lessee as allowed by regulation, to ensure that all existing oil field waste is properly addressed.

Should a parcel be leased and developed, generation and temporary storage of waste materials (solid and liquid) would likely occur. Waste materials would be managed in accordance with Onshore Oil and Gas Order Nos. 1 & 7, the Resource Conservation and Recovery Act (RCRA), applicable WDEQ regulations, and Wyoming Oil and Gas Conservation Commission (WOGCC) rules. Fluid handling would be evaluated at the development stage and fluids associated with any subsequent drilling, completions and/or production would either be treated, evaporated, or transferred to a WDEQ-authorized commercial treatment, storage, or disposal facility; solids would be treated on site or transferred to a WDEQ-authorized facility.

### **3.10 Water Resources**

Surface water hydrology within the area is typically influenced by geology, soil characteristics, precipitation and vegetation. Anthropogenic factors that currently affect surface water resources include livestock grazing management, private, commercial and industrial development, recreational use, drought, and vegetation control treatments. Based on best available data, the vast majority of the nominated parcels are within the following HUC8 watersheds: Blacks Fork, Dry Fork Cheyenne, Lightning, Lance, Upper Bighorn and Upper Green. The remaining parcels are located in the Antelope, Beaver, Clarks Fork Yellowstone, Great Divide Closed Basin, Greybull, Little Powder, Little Snake, Middle North Platte-Casper, Muddy, Salt, South Fork Powder, Upper Belle Fourche, Upper Cheyenne, Upper Powder, Upper North Platte and Vermillion HUC8 units.

Groundwater hydrology within the area is influenced by geology and recharge rates. Groundwater quality and quantity can be influenced by precipitation, water supply wells and various disposal activities. Groundwater quality across the applicable field offices varies with depth from potable waters with low total dissolved solids (TDS) to highly saline, non-potable sources. Most of the groundwater in Wyoming is used for industrial, domestic and livestock/irrigation purposes. The information contained in Appendix 5.9, Hydraulic Fracturing White Paper (see section entitled *Operational Issues/Water Availability and Consumption Estimates*) is incorporated by reference.

Several parcels contain land with private surface overlying federal minerals (i.e., split-estate). The private surface lands have or have the potential to contain private residences and associated facilities such as domestic or stock water supply wells. Lands used as rangeland can also have stock water supply wells.

### **3.11 Vegetation**

Please refer to the approved RMP FEISs for a more detailed description of the vegetation resources in the planning areas, including for sensitive or Threatened and/or Endangered plant species.

None of the parcels are known to contain sensitive or T/E plant species. Two parcels have lands that potentially are used to produce commercial crops such as corn, barley, alfalfa, and/or dry beans. Several additional parcels are used for pasture/grazing lands but the vast majority are shrublands with interspersed pockets of barren areas.

Infestations of noxious weeds can have a negative impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Locally, regionally, and nationally noxious weeds infestations cause decreased quality of agricultural products due to high levels of competition from noxious weeds; decreased quantity of agricultural products due to noxious weed infestations; and increased costs to control and/or prevent the noxious weeds.

### **3.12 Livestock Grazing/Wild Horses**

The proposed parcels are, in many cases, used for livestock grazing as they are located in primarily rural areas with large blocks of public domain lands. The proposed parcels could contain range improvement structures such as reservoirs, water wells, and fences.

Several of the parcels are also located within BLM Wild Horse Herd Management Areas (HMAs). See: <https://www.blm.gov/programs/wild-horse-and-burro/herd-management/herd-management-areas/wyoming> and the applicable RMPs. PFO, NFO and KFO do not have any wild horses, or HMAs.

### **3.13 Wildlife, Fish, and Special Status Species (Plants and Animals)**

#### **3.13.1 Special Status Species**

Parcels proposed for lease may contain habitat for sensitive species.

Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires that the BLM ensure that any action authorized, funded, or carried out by the BLM is not likely to jeopardize the continued existence of any federally designated Threatened or Endangered (T&E) species.

The BLM Special Status Species Policy outlined in BLM Manual 6840 and BLM-Wyoming IM WY-2010-027 ("Update of the Bureau of Land Management, Wyoming, Sensitive Species List – 2010"), is to conserve listed species and the ecosystems on which they depend, while ensuring that actions authorized or carried out by the BLM are consistent with the conservation needs of special status species and minimize the likelihood and need for federal listing under the ESA.

By BLM policy, the BLM will conference with the FWS on species proposed for federal listing where the BLM determines its actions may affect listed or candidate species. Section 7 consultation with the FWS is normally completed at the time the RMPs are revised or amended, and when determined necessary for site-specific authorizations.

The BLM is responsible for managing BLM-designated sensitive plant species on public lands (see <http://www.blm.gov/wy/st/en/programs/pcp/species/sensitive.html>).

### **3.13.2 Greater Sage-grouse**

See Appendix 5.2.1 for Greater Sage-grouse – Affected Environment

### **3.13.3 Big Game**

See Appendix 5.3.1 for Big Game – Affected Environment

## **3.14 Cultural and Heritage Resources, Including Paleontology, Traditional Cultural Properties, and Historic Trails**

All parcels addressed in this EA have the potential to contain surface and buried archaeological materials or may be located in an area which could affect the setting of known or unknown historic sites, and/or Traditional Cultural Properties (TCPs). Once the decision is made by the lessee to develop a lease, an area-specific cultural records review would be completed to determine if there is a need for a cultural inventory of the areas of proposed surface disturbance. Generally, a cultural inventory will be required before new surface disturbance and all historic and archaeological sites that are eligible for listing in the National Register of Historic Places would be either avoided by the undertaking, have adverse effects to sites minimized or mitigated, or have the information in the sites extracted through archaeological data recovery.

Fifty-six parcels are subject to a CSU and/or NSO for protection of National Historic Trail remnants and/or the visual setting of the trail corridor, or for the protection of eligible cultural sites.

The nominated parcels also have a potential to contain vertebrate and non-vertebrate fossils. Of the 120 parcels evaluated, 98 have the potential to contain fossils. For the proposed action, 47 of the 61 parcels proposed have the same potential. Post-lease development proposals would be evaluated on a case-by-case basis to determine if paleontological surveys would be required prior to surface disturbance.

## **3.15 Recreation**

Recreational use of public lands and the surrounding areas is typically for hunting, fishing, camping, sightseeing, off-highway vehicle use, and other recreational activities. Tourism is one of Wyoming's largest industries, and much of the state's tourism is attributable to the outdoor recreation supported by the state's open and scenic spaces. Wildlife in Wyoming is associated with a significant amount of the recreational opportunities enjoyed across the state. According to the 2011 National Survey of Fishing, Hunting, and Wildlife-associated Recreation, more than 443,000 people participated in fishing and hunting, and an additional 151,800 people participated in some other form of wildlife watching in Wyoming in 2011 (USFWS 2011).

BLM-administered public lands in Wyoming provide habitat for wildlife and support a wide range of wildlife and non-wildlife related recreational experiences. According to the 2015 Department of Interior report, recreational use of BLM administered lands by state residents and out of state visitors was estimated to support nearly \$173 million in economic activity across the state, and directly and indirectly (including induced) support 1,675 jobs and \$52.3 million in labor income for Wyoming residents. Though lands nominated for leasing in this upcoming sale support only a small fraction of the recreational opportunities supported by BLM administered lands across the state, recreation-related visits in these areas contribute to the quality of life of Wyoming residents, stimulate economic activity, and support employment opportunities.

## **3.16 Visual Resource Management (VRM)**

The BLM Visual Resource Management (VRM) Class objectives are as follows:

Class I: to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: to retain the existing landscape character and the level of change to the characteristic landscape should be low. Management activities should not attract the attention of the casual observer. Changes would be required to repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. Modifications to a proposal would be required if the proposed change cannot be adequately mitigated to retain the character of the landscape.

Class III: to partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV: to provide for management activities which require major modification of the existing landscape character. Every attempt, however, should be made to reduce or eliminate activity impacts through careful location, minimal disturbance, and repeating the basic landscape elements.

Where applicable, VRM lease stipulations are applied to the proposed parcels in conformance with the approved RMPs. In particular, twelve parcels in the HDD, five of which are in the proposed action, are within VRM II areas and subject to a CSU stipulation to ensure compliance with the above-listed standard. All other parcels are within VRM III or IV areas.

The WY State Director signed the decision record for the Rawlins RMP amendment for VRM on October 3, 2018. The parcels have been reviewed to ensure that all appropriate stipulations emanating from that decision have been attached.

### **3.17 Socioeconomics, Environmental Justice, and Public Health and Safety**

#### **3.17.1 Socioeconomics**

Please refer to the applicable RMP FEISs for additional discussion on socioeconomics within the project area.

As well, more information regarding the socioeconomics and the contributions from recreation to local economies can be found in the following documents: GR RMP FEIS pgs 330-331, 336-337, 439, 441, KFO RMP FEIS pgs. 3-166 and 3-178, PFO RMP FEIS pgs. 3-80 - 3-81, RFO RMP FEIS pgs. 3-74 - 3-77, LFO RMP FEIS pgs. 246-247 and 576-577, BFO RMP FEIS pgs. 614-615 and 631-632, BHB RMP FEIS pgs. 3-251 - 3-252 and 3-281 - 3-283, NFO RMP FEIS pgs. 103, CFO RMP FEIS pgs. 3-128, 3-135 - 3-136; ARMPA 4-177 - 4-187.

The counties within which the proposed parcels are located collectively make up the analysis area in which potential socioeconomic impacts of the proposed lease sale are considered. Over the last decade and half, Wyoming has experienced moderate population growth, increasing by approximately 19% between 2000 and 2015.

The local customs, culture, and history of communities within Wyoming are entwined with the lands and mineral estates administered by the BLM. People derive a wide range of values from their access, use, development, and enjoyment of natural landscapes administered by each field office. These values contribute to the unique sense of place indicative to rural Wyoming, as well as to the social and economic well-being of households and communities across these five counties. Since BLM management actions could affect future access, use, development, and enjoyment of the natural landscapes they administer, field office land use and leasing decisions can directly affect the social, cultural, and economic well-being of surrounding towns, cities, rural areas.

Wyoming has a long history in mineral development, and typically accounts for between 2% and 3% of U.S. crude oil production (U.S. EIA, 2016). In 2016, the mining sector supported 6% of employment and 12% of labor earnings statewide (BEA 2017s, BEA2017b).

Federal oil and gas leases generate a one-time lease bonus bid, as well as annual rents during the life of the lease, or until hydrocarbon production begins on the leased parcel. Nominated parcels approved for leasing are offered by the BLM quarterly at auctions starting at a minimum bid of \$2.00 per acre. If parcels do not receive the minimum competitive bid, they may be leased later as noncompetitive leases that do not generate bonus bids. In general, lease sales in Wyoming are highly competitive and parcels with high potential for oil and gas production regularly command bonus bids in excess of the minimum bid.

Rent payments are equal to \$1.50 an acre for the first five years and \$2.00 an acre for the second five years of the lease. Typically, these leases expire after 10 years unless held by production. During this lease period, annual rental payments are paid on leased parcels until one or more wells are drilled that result in production, then the lessee begins paying annual royalties calculated as a percentage of the value of production from the parcel.

Fifty-one percent of federal mineral leasing revenues are to go to the Treasury Department, while approximately forty-nine percent are distributed back to the state in which the revenues were generated. In Wyoming, federal mineral receipts distributed back to the state follow a legislatively established, two-tier formula. The first tier covers total annual receipts up to \$200 million and the second tier applies to receipts over \$200 million per year. Based on the state's legislatively established two-tier formula, Wyoming allocates these revenues to public school districts, the highway and county road fund, cities and towns, the University of Wyoming, capital construction projects, and the state's budget reserve account.

Although the economic activity associated with mineral development, and the public revenues generated from federal mineral leasing and development, play an important role in supporting the economic well-being of communities; resource development can have an adverse effect on other socioeconomic values people derive from these natural landscapes.

County level populations have decreased overtime (2010-2017) throughout WY according to data obtained from the US Census Bureau, Population Division (March 22, 2018) although NE WY (Converse County and portions of the Powder River Basin) are seeing increased activity associated with the Niobrara play. While not seeing the population growth, portions of the Rawlins Field Office are having success with new, limited, horizontal oil plays. Most of this development is still in the exploratory phase however.

### **3.17.2 Environmental Justice**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations..." (Executive Order 12898). Executive Order 12898 also fully applies to Indian tribes and therefore, it is important to determine whether any Indian tribes are present in the area. The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes that may experience common conditions of environmental exposure or effects associated with a plan or project.

Minority populations as defined by Council on Environmental Quality (CEQ) guidance under the National Environmental Policy Act (CEQ 1997) include individuals in the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population for environmental justice consideration is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater..." (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Calculations are made to identify the "total minority" population which refers to that part of the total population which is not classified as Non-Hispanic White Only by the U.S. Census Bureau. By using this definition of minority population, the percentage is inclusive of Hispanics and multiple race categories and any other minority single race categories. This definition is most inclusive of populations that may be considered as a minority population under EO 12898.

Low-income populations are determined by the U.S. Census Bureau based upon poverty thresholds developed every year. For this project we will use the same criteria for identifying low-income populations for environmental justice considerations as is used for identifying minority populations (50 percent or “meaningfully greater”). We identify low-income population percentages and minority population percentages that are “meaningfully greater” as at least five (5) percentage points higher than for the State of Wyoming. Based on these criteria, the environmental justice populations were identified in the following locations: Albany County (low-income EJ populations), Carbon County (minority low-income populations), Fremont County (minority and low-income EJ populations), Sweetwater County (minority EJ populations), and Teton County (minority EJ populations).

### **3.17.3 Public Health and Safety**

Oil and gas development, as well as other industrial uses, such as coal and trona mining, has been occurring in Wyoming for many decades. Due to the scattered nature and the small area encompassed by the proposed parcels coupled with low population density, industrial safety programs, standards, and state and federal regulations, offering these parcels is not expected to substantially increase health or safety risks to humans, wildlife, or livestock. Parcels that contain lands with private surface overlying federal minerals (i.e., split-estate) have or have the potential to contain private residences and associated facilities such as domestic water supply wells. Several of these parcels may be used for individual, dispersed, recreational activities which could expose these users to oil and gas related activity.

## **4.0 Impact Analysis**

The sale of parcels and issuance of oil and gas leases is strictly an administrative action. Nominated lease parcels are reviewed under the approved RMP, and stipulations are attached to mitigate any known environmental or resource conflicts that may occur on a proposed lease parcel. On-the-ground impacts would not occur until a lessee or their designated operator applies for and receives approval to undertake surface-disturbing lease actions.

The BLM cannot reasonably determine at the leasing stage whether or not a nominated parcel will actually be leased, or if leased, whether or not the lease would be explored or developed or at what intensity development may occur.

The uncertainty that exists at the time the BLM offers a lease for sale includes crucial factors that will affect potential impacts, such as: well density; geological conditions; development type (vertical, directional, horizontal); hydrocarbon characteristics; equipment to be used during construction, drilling, production, and abandonment operations; and potential regulatory changes over the life of the 10-year primary lease term. (See Section 4.5.3)

If lands are offered, leased, and a proposal for site-specific lease operations is received by the BLM, additional NEPA compliance documentation and technical analysis would be prepared by the BLM. Aside from the applicable protection measures required under the lease stipulations (see Appendix 5.4), additional mitigation may be applied as COAs at that time to mitigate identified impacts.

As described in Section 1.4, above, this EA tiers to the applicable RMP FEISs. In the impacts analysis for the alternatives, below, this EA will only address those resources and impacts where the BLM has determined there are new circumstances or information, or where we believe it will be helpful to inform the public about actions that may occur on public lands. This approach comports with the BLM’s NEPA Handbook H-1790-1 (at page 28):

*The tiered EA for the individual action need not re-analyze the effects on resources fully analyzed in the broader EIS, but may instead focus on the effects of the individual action not analyzed in the broader EIS.*

The EAs tiered to the existing field office/resource area RMPs and their respective Environmental Impact Statements (EISs), in accordance with 40 CFR § 1502.20:

*Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review... the subsequent...environmental assessment need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action.*

For additional descriptions of the potential direct, indirect, and the cumulative impacts for the alternatives considered below, please refer to the RMP FEISs referenced in Section 1.4.

#### **4.1 No Action Alternative**

Under the No Action Alternative, the proposed lease sale parcels would not be offered at this time.

Under this alternative, none of the proposed parcels would be offered for lease at the oil and gas sale (at least as it pertains to 2020 Fourth Quarter sale; see Section 1.1) and there would be no subsequent direct or indirect impacts to the existing environment caused by potential oil and gas lease operations. The No Action Alternative would result in the continuation of already-approved land uses, but would not result in impacts relating to exploration and development of these oil and gas lease parcels, because they would not be leased. Other exploration and development activities would continue in surrounding areas that are currently leased and could contribute to any ongoing or projected changes in climatic conditions and resultant landscape effects identified.

##### **4.1.1 Socioeconomics**

Under the No Action Alternative, none of the proposed parcels would be offered for lease, resulting in reduced bonus bid revenues and rentals. Since not leasing these minerals would prevent private entities from exploring and developing these minerals, subsequent oil and gas production and generation of royalty revenues would not occur.

The State of Wyoming, as well as many counties and communities within, rely on oil and gas development as an important part of their economic base. The employment and purchasing opportunities associated with developing and producing wells on these leases would also be foregone, as would the opportunity to provide oil and gas resources from these lease parcels to help meet the nation's energy needs. Refer to the applicable RMP FEISs, including Section 4.11 of the Wyoming Greater Sage-grouse Proposed Land Use Plan Amendment and FEIS (beginning on page 4-134) for additional discussion of potential socioeconomic impacts.

#### **4.2 Proposed Action Alternative**

The Proposed Action Alternative would offer 61 parcels (comprised of 63,313.42 acres) at the BLM-Wyoming's 2020 Fourth Quarter competitive oil and gas lease sale. Appendix 5.4 describes the stipulations that would be applied to each parcel to mitigate anticipated impacts in conformance with the applicable field office RMPs.

The approved RMPs, as amended, have evaluated the need to protect resources on public lands in accordance with the BLM's multiple-use and sustained yield mandate. Three categories of stipulations are used by BLM-Wyoming (Uniform Format for Oil and Gas Lease Stipulations, March 1989):

- No Surface Occupancy (NSO) stipulation: use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values.
- Controlled Surface Use (CSU) stipulation: use and occupancy are allowed (unless restricted by another stipulation) but identified resource values require special operational constraints that may modify the lease rights.
- Timing Limitation Stipulations (TLS): prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of site-specific analysis demonstrates the continued need for such mitigation and that less stringent, project specific mitigation measures would be insufficient.

### **4.3 RMP Special Designations**

The proposed parcels are located within areas open to leasing under the approved RMPs. Applicable lease stipulations for RMP Special Designations have been added to each parcel to ensure conformance with the approved RMPs. For parcels located in ACECs open to leasing under the approved RMPs, at the time of a site-specific application for lease operations ACEC values will be identified and conditions of approval to mitigate adverse impacts to ACECs may be imposed at that time. A few parcels are located adjacent to WSAs and/or are within SMAs. These impacts are generally addressed in the Recreation and Visual Resource Management sections.

Impacts to lands identified as having wilderness characteristics as a result of future lease development would be consistent with those identified in the Field Office RMPs, as amended (2015), and may include both short-term and long-term direct and indirect impacts. Should development of the parcels occur, this could result in the temporary loss of one or more of the individual wilderness components including indirectly affecting any aesthetic values. Specific impacts, and necessary mitigation, would be identified at the APD stage should the parcels be sold and development proposed. Stipulations applied for other resource protection could mitigate impacts to LWCs. Parcels located within SMAs have been stipulated in accordance with the appropriate RMPs such that surface use would be controlled, or surface occupancy would be prohibited. Where surface occupancy is prohibited, operations could be sited off-lease in areas where BLM would not have the same level of regulatory authority as if the operations were occurring on public lands.

### **4.4 Air Resources**

#### **4.4.1 Air Quality**

See Appendix 5.1.3 for Air Quality

### **4.5 Greenhouse Gas Emissions and Climate Change**

See Appendix 5.1.4 for Greenhouse Gas Emissions and Climate Change

#### **4.5.1 Direct Emissions**

See Appendix 5.1.4.1 for Direct Emissions

#### **4.5.2 Indirect Emissions**

See Appendix 5.1.4.2 for Indirect Emissions

#### **4.5.3 Uncertainty**

##### ***4.5.3.1 Direct and Indirect Emission Estimate Uncertainties***

See Appendix 5.1.5.1 for Direct and Indirect Emission Estimate Uncertainties

##### ***4.5.3.2 Oil and Gas Production and End Use Uncertainty***

See Appendix 5.1.5.2 for Oil and Gas Production and End Use Uncertainty

#### **4.5.4 Climate Change Impacts**

See Appendix 5.1.6 for Climate Change Impacts

#### **4.5.5 Mitigation of Impacts from GHG Emissions and Climate Change Impacts**

See Appendix 5.1.7 for Mitigation of Impact from GHG Emissions and Climate Change Impacts

#### **4.6 Geology and Mineral Resources**

At the time of a site-specific proposal for development of the lease, Standard Lease Stipulation No. 3 protects the prior rights:

*Operations will not be approved which, in the opinion of the authorized officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.*

The oil and gas lessee would conduct its operations, so far as reasonably practicable, to avoid damage to any known deposit of any mineral for which any mining claim is located. The lessee would be required to not endanger or unreasonably or materially interfere with any mining claimant's operations, including any existing surface or underground improvements, workings, or facilities that may have been made for the purpose of mining operations. The provisions of the Multiple Mineral Development Act (30 U.S.C. § 521 et seq.) will apply to the leased lands.

The BLM identified ten parcels that contain lands that could pose potential conflicts with existing coal mining operations and/or pending coal Lease by Applications (LBAs). If these lands were offered, leased, and development was subsequently proposed, the BLM may be required to decide whether to approve oil and gas operations that could impede or substantially complicate the economic recovery of coal under existing leases. If oil and gas operations on these leases were authorized, there could be potential worker safety concerns presented by having coal mining and oil and gas operations occurring simultaneously in the same area. In some cases, the two mineral development activities could not reasonably occur at the same time (such as when coal is being surface-mined at a location where proposed oil and gas facilities would be located).

As a result, these parcels (whole or in part) are deferred until there remain no unresolved conflicts with the existing coal mine operations.

#### **4.7 Master Leasing Plan (MLP) Areas**

Under previous BLM policy, (WO IM 2010-117, Oil and Gas Leasing Reform), MLP analysis was conducted in the WR/BBD RMPs as a tool to facilitate resource protection while allowing for oil and gas development. WO IM 2018-034 was signed and issued January 31, 2018, superseding IM 2010-117 and replacing any conflicting guidance or directive found in the BLM Manual or Handbook. Under the new guidance, no new MLPs will be initiated by the BLM, though the existing MLPs remain in effect.

Under the Proposed Action none of the parcels are located in MPL areas.

#### **4.8 Soils**

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to soils. Subsequent development of the lease could physically disturb soils within the disturbed project areas. Direct impacts from the construction of well pads, access roads, and reserve pits include removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of top soil productivity and susceptibility to wind and water erosion. Indirect impacts such as runoff, erosion, and off-site sedimentation could result from construction and operation of well sites, access roads, gas pipelines and facilities.

Contamination of soil from drilling/completion and production wastes mixed into soil or spilled on the soil surfaces could cause a long-term reduction in site productivity if not adequately identified and addressed. Many of these direct impacts would be mitigated through proper design, construction and maintenance, and implementation of BMPs.

As required in the applicable RMPs, surface disturbance may be restricted or prohibited on steep slopes and within floodplains. Lease Notice No. 1 addresses surface disturbance on slopes greater than 25 percent and is applied to all parcels.

Prior to authorization of surface disturbance on a lease, the BLM will require the lessee or their designated operator to submit a Surface Use Plan of Operations to the BLM. The requirements in the BLM-Wyoming Reclamation Policy would be implemented for all surface-disturbing activities. Stabilization and reclamation of disturbed areas (both interim and final) will be required, in accordance with Onshore Oil and Gas Order No. 1.

Where applicable, operations on federal leases are required to have spill prevention, control, and countermeasure plans in place. Where spills do occur, the BLM will follow its policies (see WY IM 2009-021) and reporting requirements (see NTL-3A) to ensure the site is cleaned up to the applicable standards.

#### **4.9 Solid and Hazardous Wastes**

Leasing of the parcels will not directly result in the generation, transport, or disposal of solid and hazardous wastes. If leased, and if operations are proposed on these leases, the lessee will be required to comply with applicable environmental regulations that address exploration and production wastes.

Impacts could be in the form of drilling or completion fluid spills, oil and produced water spills, solid waste or chemical releases, fuel spills, and trash scatter on and off the well pads.

Management of wastes associated with the drilling, completion and production operations on are regulated under the Resource Conservation and Recovery Act (RCRA), Subtitle C regulations. Additionally, waste management requirements are included in the Surface Use Plan of Operations and the drilling plan required for in all APDs. See also BLM-Wyoming Instruction Memorandum WY-2012-007, "Management of Oil and Gas Exploration and Production Pits."

Lessees or their operators proposing oil storage would be required to have approved Spill Prevention Control and Countermeasure Plans, if the applicable requirements of 40 CFR 112 are met, and must comply with all requirements for reporting of undesirable events under NTL-3A. Lease bonds would not be released until all facilities have been removed, wells are plugged, and satisfactory reclamation has occurred.

BLM will work with new lessee's and any previous Record Title Owners and/or Operating Rights Owners, to the extent allowed by regulation, to address existing unplugged well bores.

#### **4.10 Water Resources**

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to water resources. Subsequent development of a lease may lead to surface disturbance from the construction of well pads, access roads, pipelines, and powerlines, which can result in degradation of surface water quality and groundwater quality from point source pollution, nonpoint source pollution, increased surface water runoff and increased erosion. Alteration of natural drainage paths and channel morphology can also occur as a result of surface disturbance associated with the installation of oil and gas wells. Removal of vegetation can also cause water erosion, leading to a loss of channel stability as well as an increase in sedimentation within drainages.

All parcels are subject to Standard Lease Notice No. 1 which requires at a minimum 500' offset from perennial surface waters and with site-specific analysis could require a greater offset requirement if site-specific impact analysis finds that it is warranted. Several parcels also contain specific stipulations for water resources (see Appendix 5.4).

Spills of materials used to drill/complete the wells and/or produced formation fluids could result in contamination of the soil, and may potentially impact surface and groundwater resources in the long term if not detected and addressed.

A number of techniques may be used in exploration and development operations to increase or enhance the flow of oil and gas. They include hydraulic fracturing and acid introduction to dissolve the formation matrix and create larger void space(s).

Without a discrete development proposal, the use of hydraulic fracturing in the oil and gas development process cannot be predicted. However, this EA incorporates by reference, in its entirety, the Hydraulic Fracturing White Paper included in Appendix 5.9. This document provides a general discussion of the hydraulic fracturing process and issues associated with its use.

The potential for negative impacts to groundwater caused from completion activities such as hydraulic fracturing, have not been confirmed but based on its history of use are not likely. A recent study completed on the Pinedale Anticline did not find a direct link to known detections of petroleum hydrocarbons to the hydraulic fracturing process. Groundwater contamination investigations have also been conducted at the Pavillion gas field and according to a November 7, 2016 fact sheet from the Wyoming Department of Environmental Quality, it is unlikely that the hydraulic fracturing activities have caused impacts to water supply wells ([http://deq.wyoming.gov/media/attachments/Water%20Quality/Pavillion%20Investigation/Investigation%20Final%20Report/03\\_Fact-Sheet-for-the-Pavillion-Wyoming-Area-Domestic-Water-Wells-Final-%20Report.pdf](http://deq.wyoming.gov/media/attachments/Water%20Quality/Pavillion%20Investigation/Investigation%20Final%20Report/03_Fact-Sheet-for-the-Pavillion-Wyoming-Area-Domestic-Water-Wells-Final-%20Report.pdf)).

Authorization of the proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection and the BLM would deny any APD who proposed drilling and/or completion process was deemed to not be protective of usable water zones as required by 43 CFR 3162.5-2(d).

As stated, groundwater could be affected by multiple factors, including industrial, domestic, or agricultural activities through withdrawal, injection (including chemical injection), or mixing of materials from different geologic layers or the surface. Withdrawal of groundwater could affect local groundwater flow patterns and create changes in the quality or quantity of the remaining groundwater. Based on an evaluation of statewide groundwater availability, and the total projected number of wells to be drilled/completed on BLM administered lands, adequate water supplies are available and would not result in significant impacts on a regional basis even during drought conditions. Loss of a permitted source of groundwater supply due to drawdown would be considered a significant impact if it were to occur. This potential would be assessed at the development stage should a parcel be sold and subsequent development proposed. The drilling of horizontal wells, versus directional and vertical wells may initially appear to require a greater volume of water for drilling/completion purposes. However, a horizontal well develops a much larger area of the reservoir than a directional and/or vertical well and actually results in a lesser volume of fluids being required.<sup>2</sup>

Information contained in Appendix 5.9, Hydraulic Fracturing White Paper, Section III, Potential Impacts to Usable Water zones (pages 6-10 and Attachment 1), is incorporated by reference. The information being incorporated by reference is generally summarized below. Impacts to the quality of groundwater, should they occur, would likely be limited to a near well bore location due to inferred groundwater flow conditions in the area of the parcels and based on studies completed in the Pinedale Anticline. Impacts to near well groundwater could occur from poor casing and/or cementing practices and the use of potentially hazardous materials within those formations containing freshwater and/or usable water zones. The materials proposed for use in the drilling program within freshwater and/or usable water zones are typically water based and would be protective of usable zones, both water quality and formation integrity. If an operator proposed to use oil based mud in their drilling program, their use is limited to the production formation and formations containing waters deemed to not be usable.

Exploration, development, and production of traditional oil and gas resources typically do not significantly deplete groundwater on a regional basis but may have a limited, short-duration, near-well bore drawdown around the water supply well depending upon length and intensity of pumping activity. Oil and gas resources are often developed from geological reservoirs that do not contain significant amounts of freshwater with the exception of some CBM developed formations; however, the development and production of oil and gas can affect adjacent or nearby

---

<sup>2</sup> Vertical and directional wells can easily require one well per 10 acres resulting in 64 wells per section. This is in contrast to one horizontal well per 640 acres or one per 320 acres which results in a net decrease in total fluid volumes needed and in surface disturbance acreages.

aquifers. Potential impacts result from the creation of artificial pathways between oil and gas reservoirs and adjacent aquifers. Modification of ground water flow paths may cause fresh ground water to come in contact with oil or gas. In addition, improper disposal of waste waters (brine, storm runoff), drilling/completion fluids, and other wastes can impact the quality of underlying ground water (U.S EPA 1987).

A high risk of fluid migration exists along the vertical pathways created by inadequately constructed wells and unplugged inactive wells. Brine or hydrocarbons can migrate to overlying or underlying aquifers in such wells. This problem is well known in the oil fields around Midland, TX. Since the 1930s, most States have required that multiple barriers be included in well construction and abandonment to prevent migration of injected water, formation fluids, and produced fluids. These barriers include (1) setting surface casing below all known aquifers and cementing the casing to the surface, and (2) extending the casing from the surface to the production or injection interval and cementing the interval. Barriers that can be used to prevent fluid migration in abandoned wells include cement or mechanical plugs. They should be installed (1) at points where the casing has been cut, (2) at the base of the lowermost aquifer, (3) across the surface casing shoe, and (4) at the surface. Individual states, including Wyoming, and the BLM have casing programs for oil and gas wells to limit cross contamination of aquifers. Any proposed drilling/completion activities would have to be in compliance with Onshore Order #2, 43 CFR 3160 regulations, and not result in a violation of a Federal and/or State law. If these conditions were not met, the proposal would be denied. As such, no significant impacts to groundwater from the proposed action are expected.

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to watersheds. Subsequent development of a lease may result in long- and short-term alterations to the hydrologic regime depending upon the intensity and context of a specific proposal. Flows of perennial streams, ephemeral, intermittent rivers and streams and their associate could be directly affected in the short term by an increase in impervious surfaces resulting from the construction of the well pad and road. An increase in impervious surfaces provides for reduced infiltration which can then cause overland to move more quickly causing peak flow to potentially occur earlier, have a higher flow velocity and/or a larger volume than the channels are equipped for. Increased velocity and volume of peak flow can cause bank erosion, channel widening, downward incision, and disconnection from the floodplain. The potential hydrologic effect to low flow is reduced surface storage and groundwater recharge, which can then result in reduced base flow to perennial rivers and/or streams and potentially causing intermittent channels to become ephemeral. The direct impact would be that hydrologic processes may be altered where the perennial, ephemeral, and intermittent river and stream system responds by changing physical parameters, such as channel configuration. These changes may in turn impact water quality and ultimately the aquatic ecosystem through eutrophication, changes in water temperature, and/or a change in the food structure.

Minor long-term direct and indirect impacts to the watershed and hydrology could continue for the life of surface disturbance from water discharge from roads, road ditches, and well pads, but would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and powerlines have taken place. Interim reclamation of the portion of the well pad not needed for production operation, as well as re-vegetating the portion of the pad that is needed for production operations, as well as re-vegetating road ditches would reduce this long-term impact. Short-term direct and indirect impacts to the watershed and hydrology from access roads that are not surfaced with impervious materials would occur and would likely decrease in time due to reclamation efforts.

Water depletions potentially affecting T&E aquatic species would require consultation with USFWS, and applicable point-source discharges would require permits under the National Pollution Discharge Elimination System (NPDES) and approval by the BLM prior to disposal of water produced from federal oil and gas leases; potential impacts would be mitigated at that time.

Underground waste disposal is regulated under the Underground Injection Control (UIC) program, which was authorized under the Safe Drinking Water Act. If a drilling/completion proposal is found to not be protective of usable water zones, as required by 43 CFR § 3162.5-2(d) and Onshore Oil and Gas Order No. 2, the proposal could be denied by the BLM. Requirements for groundwater monitoring have been instituted throughout Wyoming by the WOGCC. This monitoring will add a level of certainty regarding the impacts of oil and gas drilling/completion activities on groundwater in Wyoming.

The use of practices such as but not limited to closed-loop mud systems or lined reserve pits would reduce or eliminate seepage of waste fluids into the soil and eventually reaching ground water. The casing and cementing requirements imposed on proposed wells would reduce or eliminate the potential for groundwater contamination from drilling/completion/production fluids and other surface sources. Additionally, the use of closed-loop or semi-closed loop drilling systems may be required by the BLM (see BLM-Wyoming Instruction Memorandum WY-2012-007, “Management of Oil and Gas Exploration and Production Pits”).

Stormwater Pollution Prevention Plans (SWPPs) are required by the State of Wyoming before any surface disturbance associated with construction actions greater than 1 acre in size. Prior to authorization of surface disturbance on a lease, the BLM will require a Surface Use Plan of Operations be submitted to the BLM, and the BLM authorized officer may require additional erosion control measures to reduce the volume of surface runoff and subsequent sediment transport. Upon abandonment of the wells and/or when access roads are no longer in service, the BLM will require surface reclamation of the disturbed areas as described in Standard Lease Term No. 6 and in accordance with the approved APD or Sundry Notice.

#### **4.11 Vegetation**

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to vegetation. Impacts to vegetation may occur if a lease is issued and the lease is developed. The potential site-specific impacts would be considered by the BLM, including at an onsite inspection, before surface-disturbing activities associated with federal lease operations are authorized.

Should lease operations occur on any of the proposed parcels, the related surface disturbance would result in short- and long-term losses of vegetation. Short-term vegetation loss would include all initial surface disturbance associated with the project until those portions of the well pad and associated roads are no longer needed for production operations, and any associated pipeline disturbances. Long-term vegetation loss would include those portions of the well pad and roads needed for production operations for the life of the well and travel path and shoulders of the access roads. Both short- and long-term losses of vegetation would result in a commensurate reduction in forage available for wildlife and livestock. Vegetation loss could also potentially cause a reduction in nesting habitat for ground- or shrub-nesting avian species, and a loss of hiding cover for certain avian and mammal species.

The BLM will require compliance with the Surface Use Plan of Operations and its reclamation plan, which will be evaluated in accordance with the BLM-Wyoming’s Reclamation Policy. Lease Stipulation No. 2 is applied for protection of sensitive plants and sensitive species wildlife habitats and could include measures to minimize impacts to vegetation and special status species habitats from future development activities.

The construction of an access road and well pad may unintentionally contribute to the establishment and spread of noxious or invasive weeds. Weed seed or material could be carried to and from the project areas by construction equipment, the drilling rig and transport vehicles, or vehicles and equipment associated with well production activities.

Where weed populations are present, the BLM may require a pest management plan under Onshore Oil and Gas Order No. 1. The BLM may require that certain measures be taken to mitigate potential impacts from spread of weeds. Washing and decontaminating the equipment entering and exiting the construction areas could be used to avoid spread of weeds. Additionally, seed mixes used for reclamation are required to be certified weed-free.

Site-specific surveys for special status plants and/or T/E plant species may be required at the time operations are proposed, to determine the presence/absence of special status plant species or their habitats, and to determine if mitigation measures are necessary. Habitat containing threatened, endangered, proposed, and candidate plant species, as well as those plants listed on the Wyoming-BLM sensitive species list, could limit the location of proposed operations and USFWS consultation could be required if designated critical habitats have the potential to be adversely affected. The sensitive species habitat would be avoided where possible and, in situations where these areas would not be avoided, additional mitigation may be required.

For operations occurring on split estate lands, allowable impacts to those surface uses would be negotiated with the landowner at the time operations are proposed, if the parcels are sold and leases issued. In accordance with Onshore Order #1, the operator must negotiate a surface use agreement in good faith with the landowner. If an agreement cannot be reached, the Operator may submit a bond under the Stockraising and Homestead Act (where patented under the SHRA) to cover damages to any agricultural improvements. Submittal of that bond can be appealed by the landowner if there is disagreement as to the amount of the bond and the potential monetary value of the potential damages to agricultural improvements.

#### **4.12 Wildlife, Fish, and Special Status Species (Plants and Animals)**

If the proposed parcels are leased, and if subsequent exploration and development operations are proposed, the operations could result in surface-disturbing and disruptive activities. The operations could result in population impacts and habitat fragmentation and loss.

If operations are proposed, the BLM may require additional mitigation measures in order to manage plant and wildlife habitats on public lands in support of the applicable State or Federal management objectives.

Site-specific surveys for special status plants and wildlife may be required at the time operations are proposed to determine the presence/absence of important plant and wildlife resources, including special status species such as nesting birds, sensitive plants, sensitive mammals, amphibians and reptiles.

Well pad, road, and pipeline development in undisturbed areas, could result in habitat fragmentation and direct mortality of wildlife and plant species. Short-term habitat loss would include initial surface disturbance associated with the project. This short-term disturbance typically would be ongoing until those portions of a well pad not needed for production operations, road disturbance outside the shoulders, and the pipeline disturbance are reclaimed. Long-term habitat loss would include those portions of the pad needed for production operations for the life of the well and the running surface of the access roads. Impacts from surface-disturbing activities may also include behavioral changes from increased human activity associated noise and fragmentation.

Impacts to streams, fisheries, riparian habitat, and aquatic species would be mitigated through application of the requirements in Lease Notice No. 1 or special lease stipulations.

As required by the applicable RMPs, wildlife impacts are mitigated through NSO, TLS, and/or CSU stipulations. See Appendix 5.4. In the event the proposed leases are issued and lease operations are proposed, BMPs such as directional and/or horizontal drilling, habitat avoidance, and consolidation of infrastructure may be implemented to mitigate site-specific impacts to wildlife and their habitats. Additionally, the BLM would coordinate with the WGFD and consider their guidelines (such as those in "Recommendations for Development of Oil and Gas Resources within Crucial and Important Habitat" (2010)).

##### **4.12.1 Special Status Species**

As required by the applicable RMPs, wildlife impacts are mitigated through NSO, TLS, and/or CSU stipulations. See Appendix 5.4. Standard Lease Stipulation No. 2 (Appendix 5.4.1) is applied to all leases and provides protection for current and future threatened, endangered, and special status species:

*The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.*

Water depletions for well pad and road construction, well drilling, well completion operations, pipeline hydrostatic testing, and dust abatement could potentially reduce stream flows in the Colorado and Platte River systems, potentially affecting threatened or endangered fish, wildlife and plant species that depend on habitats associated with those river systems. All depletions in these river systems are subject to the Fish and Wildlife Service (FWS) mitigation requirements (including potential depletion fund payments); specific project proposals may be required to undergo consultation with the FWS before any project approval.

#### **4.12.2 Greater Sage-grouse**

See Appendix 5.2.2 for Greater Sage-grouse – Environmental Impacts

#### **4.12.3 Big Game**

See Appendix 5.3.2 for Big Game – Environmental Impacts

### **4.13 Cultural and Heritage Resources, Including Paleontology, Traditional Cultural Properties, and Historic Trails**

If the proposed leases are issued and the BLM receives a proposal for lease exploration and development operations, a cultural records review would be completed to determine if there is a need for a detailed cultural inventory of those areas that could be affected by the subsequent surface disturbing activities. Generally, a cultural inventory will be required and all identified historic and archaeological sites that are eligible for listing in the National Register of Historic Places or potentially eligible to be listed would be either avoided by the undertaking, have adverse effects to sites minimized or mitigated, or have the information in the sites extracted through archaeological data recovery before surface disturbance. Offering lease parcels for sale would not, in and of itself, impact historic or prehistoric resources. Development within the viewshed of contributing segments of National Historic Trails (NHT) could impact the trail setting; however, the extent of potential impacts cannot be determined absent a site-specific proposal for operations.

A site and resource inventory and mitigation process similar to that described for cultural resources also applies to paleontological resources.

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties. Compliance with Section 106 of the NHPA is a non-discretionary action that all federal agencies must perform. The RMPs considered known important cultural sites in identifying stipulations.

The implementing regulations at 36 CFR § 800 allow for a phased approach to compliance with the NHPA. Since it is impossible to determine the type and extent of surface disturbance associated with oil and gas development at the leasing stage, BLM completes its compliance responsibilities when a proponent submits an APD or other application for surface-disturbing activities on the federal lease. Due to this approach, BLM may not be aware of all cultural resources that are located in the proposed lease parcels, though the BLM would complete its phased compliance with NHPA at the time site-specific lease operations are proposed.

Cultural resource specialists review each parcel, including BLM and State Historic Preservation Officer (SHPO) record and file searches for known sites in or near each parcel. When the BLM receives an APD or other proposal for lease operations, a site-specific cultural records review is completed to determine if there is a need for cultural inventory for areas affected by surface-disturbing activities; if so, cultural resource inventory is required prior to new surface disturbance. All sites that are determined to be historic properties (sites that are listed on or are eligible for listing on the National Register of Historic Places) are avoided or mitigated. If avoidance or mitigation is not possible, proposals may be modified or denied.

Parcels offered for sale are subject to the stipulations shown in Appendix 5.4, including, where applicable, stipulations to protect Sacred, Spiritual, and/or TCPs.

Parcels offered for sale are subject to Special Lease Notice No. 2 (Appendix 5.4.1), which addresses National Historic Trails. All parcels are also offered subject to Standard Lease Stipulation No. 1 (Appendix 5.4.1), protecting historic properties and/or resources:

*This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer (SHPO) and tribal consultation) under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.*

The applicable lease stipulations shown in Appendix 5.4 will apply to the proposed parcels, and may include restrictions on surface use or occupancy within certain potential fossil yield classification areas for the protection of fossil resources.

#### **4.14 Recreation**

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to the recreational use of public land. Subsequent exploration or development of a lease may generate impacts to recreation activities.

For split estate lands or public land parcels that are small or land-locked by private or state land, recreation opportunities would be limited or non-existent due to access restrictions. Recreational use on larger blocks of public land and on smaller blocks of public land where there is public access could be impacted by oil and gas operations. The quality of the recreational experience could be diminished by noise and changes in scenic quality arising from oil and gas operations. Recreational activities on split estate lands would be at the discretion and under the control of the private landowner.

Indirect effects that might result, should exploration or development of the leases occur, could include increased employment opportunities related to the oil and gas and service support industry in the region as well as the economic contributions to federal, state, and county governments related to lease payments, royalty payments, severance taxes, and property taxes. Other effects could include the potential for an increase in transportation, roads, and noise disturbance associated with development, and potential for change in property values due to development. These effects would apply to all public land users in the study area, and surface owners above and adjacent to the proposed lease parcels. The BLM recognizes that economic activity associated with tourism and recreation can be an important contribution to local communities and their economies.

Potential impacts resulting from oil and gas development can be concerns for communities that promote recreation and tourism. Oil and gas exploration, drilling, or production, would potentially inconvenience visitors through increased traffic and traffic delays, noise, and visual impacts. The level of inconvenience would depend on the activity affected, traffic patterns within the area, noise levels, the length of time and season in which these activities occurred, and other factors. Increased truck traffic hauling heavy equipment, fracking fluids, and water as well as increased traffic associated with oil workers and increased populations could cause more traffic congestion, increase commuting times, and affect public safety. Additionally, impacts to visitors could include reduction of current viewsheds, dark night skies, and soundscapes.

Oil and gas operations could also cause game animals to move away from the activity. If lease development operations coincide with hunting season, it is expected that hunters could experience reduced success rates. It is also likely that some hunters would experience a diminished quality in their hunting adventure. In addition to facilitating mineral extraction, new oil and gas roads could provide better access to the lease areas for recreational opportunities but can also result in increased poaching activities or wildlife harassment. The presence of oil and gas facilities would likely diminish the recreational experience and a decline in recreational use of an area due to oil and gas development would potentially affect local, state, and regional revenues generated through recreation.

Parcels offered for lease sale are subject to the stipulations and lease notices shown in Appendix 5.4, including those for the protection of recreational settings. Additional mitigation, such as seasonal restrictions, directional drilling, and liquids gathering systems, could be identified at the development stage to further reduce impacts associated with oil and gas development.

#### **4.15 Visual Resource Management (VRM)**

It is not possible to accurately predict the visual impacts of oil and gas development operations at the leasing stage. Development intensity, terrain, and proximity to key observation points will greatly influence the VRM impacts. For the areas proposed for leasing, the proposed action of leasing parcels would not change the existing landscape. Lease sales do not authorize wells to be drilled prior to issuance of an APD, which requires project-specific application to the BLM and environmental analysis. If a lease were to go into production in areas that already has high levels of human modification, the proposed action would introduce visual contrasts but at limited levels given the context of the project area, the level of existing development, and the use of best management practices (BMPs). If leases were developed, structures associated with this activity could be introduced on the landscape such as roads, pads, buildings, and pump infrastructure potentially creating contrasts in form, texture, color, and line at varying levels. The activity would introduce noise from vehicles and equipment during construction and would continue to a lesser degree when construction is completed.

Night skies can be impacted due to artificial lighting. During construction and the drilling phase of a site, artificial lighting would be at its highest level. These lighting impacts are generally short term. Typically, well locations do not have permanent lighting; however, there would be changes to the current conditions and the addition of BMP's would need to be evaluated at the APD stage to minimize the contrast. Physical changes evaluated at the APD phase would consider the introduction of contrasts in line, color, form and texture.

Parcels offered for sale are subject to the stipulations shown in Appendix 5.4, such as protection of VRM Class I and II areas, where applicable. Should leases be issued and operations proposed, the BLM will review the site-specific proposal to ensure conformance with the applicable RMP VRM designations and management decisions. At that time, the BLM may require mitigation to address VRM impacts, such as siting and the use of existing landscape features, coloration of above-ground facilities and/or the use of low-profile tanks, where necessary. Visual simulations are required in VRM II areas to ensure that the class setting can be achieved during drilling and production operations.

#### **4.16 Socioeconomics, Environmental Justice, and Public Health and Safety**

##### **4.16.1 Socioeconomics**

In addition to the one-time bonus bids, leasing these parcels for federal mineral exploration would generate rental revenues. If oil and gas production were to begin on any of these leased parcels over the next 10 years, annual rent payments on the parcel held by production would stop, and lessees would instead pay royalties the market value production on that lease. Annual royalty payments on leased parcels would be equal to 12.5% of the value of annual production.

As discussed in above, approximately 51% of revenues generated from the leasing, rents, and production of minerals leased at the subject lease sale would go directly to the U.S. Treasury. The remaining 49% would be distributed to Wyoming and allocated based on its legislatively established two-tier formula to public school districts, the highway and county road fund, cities and towns, the University of Wyoming, capital construction projects, and the state's budget reserve account.

While the act of leasing federal minerals under this alternative would not result any direct surface disturbances, subsequent development of a lease may affect how local residents and land users access, use, develop, and enjoy lands in the vicinity of these leases. As a result, future development may impact the socioeconomic values people derive from these natural landscapes.

Oil and gas exploration, drilling, or production could create additional inconvenience to local businesses and residents due to increased traffic and traffic delays, noise, and visual impacts. This would likely be most noticeable in rural areas where oil and gas development has been minimal. The amount of inconvenience would depend on how other land uses are affected, traffic patterns within the area, noise levels, length of time, and season these activities occurred, etc. Creation of new access roads into an area could allow increased public access and potential exposure of private property to vandalism. For split estate leases where the surface is privately owned and the subsurface is federally-owned, surface access agreements, standard lease stipulations, and BMPs could address many of the concerns of private surface owners.

Refer to the applicable RMP FEISs, including Section 4.11 of the ARMPA FEIS (beginning on page 4-134) for additional discussion of potential socioeconomic impacts.

#### ***4.16.2 Environmental Justice***

Some of the counties where leases would be offered may have minority and/or low-income populations that meet the criteria to be considered environmental justice populations. The act of leasing federal minerals would not disproportionately adversely affect environmental justice populations. Potential future impacts associated with oil and gas development could potentially disproportionately adversely affect environmental justice populations depending upon the location and level of activity, which is unknown at this time. The BLM considers input from persons or groups regardless of age, income status, race, or other social or economic characteristics.

#### ***4.16.3 Public Health and Safety***

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to public health and safety. Subsequent development of a lease may cause impacts. Vehicle and equipment operations associated with the subsequent construction, drilling, and production operations could affect members of the public using the same roads and general areas and/or the employees of the oil and gas drilling, completion or services companies. Releases of gas from the well bore, production facilities and spills could adversely affect members of the public in the vicinity as well as members of the workforce. The level of affect would depend on the circumstances and the technological and safety controls in place.

Split estate lands have the potential for the presence or future development of private residences and associated facilities such as domestic water supply wells. Residences along routes to, or in the vicinity of, active drilling and completion operations would likely experience increased traffic and noise, as well as night lighting. Traffic and drilling operations in close proximity to residences would increase the potential for collisions with the residents, pets, and livestock, as well as an increased potential for fire, hydrocarbon release, and explosions from well blow-out during drilling operations. None of the parcels are located within incorporated areas.

The BLM will require the operator to comply with Onshore Oil and Gas Order No. 2, 43 CFR § 3162.5-1, and all requirements for reporting undesirable events under NTL-3A.

BLM Wyoming has issued policy (IM WY-2015-054, “Fluid Minerals Operations - Mitigation and Setbacks from Occupied Structures”) to address setbacks from occupied structures when proposed at the time of lease operations. In addition, other Federal and State of Wyoming public health and safety requirements apply to oil and gas operations.

#### ***4.17 Cumulative Impacts***

The BLM holds quarterly oil and gas lease sales, in compliance with the law and our regulations. As a result, numerous oil and gas lease sale parcels are being considered on the public lands around the West at any given time (among other land use plan implementation decisions). The RMP FEISs to which this EA tiers address potential cumulative effects, including as a result of other reasonably foreseeable future actions outside of their respective planning areas. Items of special interest are addressed below. Appendix 5.9 includes a White Paper on Hydraulic Fracturing and water availability/use and is incorporated by reference. Appendix 5.9 concludes that there are adequate water supplies available to support the projected oil and gas RFD on a field office and statewide basis.

#### **4.17.1 Greater Sage-grouse**

See Appendix 5.2.3 for Greater Sage-grouse – Cumulative Impacts

#### **4.17.2 Big Game**

See Appendix 5.3.3 for Big Game – Cumulative Impacts

#### **4.17.3 Greenhouse Gas Emissions**

See Appendix 5.1.8 for Greenhouse Gas Emissions

##### **4.17.3.1 Cumulative Direct Emissions-Wyoming**

See Appendix 5.1.8.1 for Cumulative Direct Emissions – Wyoming

##### **4.17.3.2 Cumulative Indirect Emissions- Wyoming**

See Appendix 5.1.8.2 for Cumulative Indirect Emissions - Wyoming

##### **4.17.3.3 National and Global Considerations**

See Appendix 5.1.8.3 for National and Global Considerations

## **5.0 Appendices**

## 5.1 Air Resources

### 5.1.1 Air Quality – Affected Environment

Regional air quality is influenced by the interaction of meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources (including natural sources), and chemical properties of emitted air pollutants. The following sections summarize the existing climate and air quality within the area potentially affected by the parcels under consideration for leasing.

A variety of pollutants can affect air quality; these pollutants and their effects on health, visibility, and ecology are described in the following sections, along with data on existing air quality conditions found within the subject field offices.

The EPA has delegated regulation of air quality to the State of Wyoming and is administered by the Wyoming Department of Environmental Quality (WDEQ). Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) identify maximum limits for concentrations of criteria air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health that, by law, require public safeguards be implemented. State standards must be at least as protective of human health as Federal standards, and may be more restrictive than Federal standards, as allowed by the Clean Air Act. Currently, the WDEQ Air Quality Division (AQD) does not have regulations regarding greenhouse gas emissions, although these emissions are regulated indirectly by various other regulations.

Pollutant concentration can be defined as the mass of pollutant present in a volume of air and is reported in units of micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), parts per million (ppm), or parts per billion (ppb). The State of Wyoming has used monitoring to determine that the HDD's planning areas are currently in compliance with Wyoming and Federal ambient air quality standards for all criteria pollutants with the exception of the Upper Green River Basin (UGRB), which includes portions of the KFO and RSFO, and all of the PFO. The UGRB is a designated nonattainment area for the 2008 ozone standard.

For the most part, the counties that lie within the jurisdictional boundaries of the HPD (Natrona, Converse, Platte, Goshen, Niobrara, Weston, Crook, Campbell, Sheridan and Johnson) are classified as in attainment for all state and national ambient air quality standards as defined in the Clean Air Act. The one exception is the City of Sheridan, which was designated as nonattainment for PM<sub>10</sub> in 1991 (56 FR 11101). On April 4, 2018, EPA removed the City of Sheridan as a nonattainment zone and approved their limited maintenance plan while re-designating them as in attainment of the NAAQS for PM<sub>10</sub> (83 FR 06848).

The counties that lie within the jurisdictional boundaries of the WR/BBD (Park, Big Horn, Washakie, Hot Springs, Fremont, Natrona, Carbon, and portions of Sweetwater) are classified as in attainment for all state and national ambient air quality standards.

Relevant air quality monitoring stations are shown in the table, below:

**Table 1: Air Quality Monitoring Stations**

County	Site Name	Type of Monitor Type	Parameter	Operating Schedule	Location	
					Longitude	Latitude
Campbell	Thunder Basin	SPM <sup>1</sup>	O <sub>3</sub> , NO <sub>x</sub> and Met	Hourly	-105.3000	44.6720
	South Campbell County	SPM	O <sub>3</sub> , NO <sub>x</sub> , PM <sub>10</sub> and Met	1/3 (PM <sub>10</sub> ) and hourly (NO <sub>x</sub> and O <sub>3</sub> )	-105.5000	44.1470

	Belle Ayr Mine	SPM	NOx and PM2.5	1/3 (PM2.5) and hourly (Ox)	- 105.3000	44.0990
	Wright	SPM	PM10	1/6	- 105.5000	43.7580
	Gillette	SLAMS <sup>2</sup>	PM10	1/6	- 105.5000	44.2880
	Black Thunder Mine	SPM	PM2.5	1/3	- 105.2000	43.6770
	Buckskin Mine	SPM	PM2.5	1/3	- 105.6000	44.4720
	Fortification Creek	WARMS <sup>3</sup>	PM2.5, Nitrate, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide, Meteorology	1/3 (PM2.5) and 1/7 (others)	- 105.9198	44.33953
	South Coal	WARMS	PM2.5 and Meteorology		- 105.8378	44.9401
	Thunder Basin	IMPROVE <sup>4</sup>	PM2.5, Nitrate, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3	- 105.2874	44.6634
Converse	Antelope Mine	SPM	PM2.5	1/3 (PM2.5) and hourly (NOx)	- 105.4000	43.4270
Johnson	Buffalo	WARMS	PM2.5, Nitrate, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide and Meteorology	1/3 (PM2.5) and 1/7 (others)	- 106.0189	44.1442
	Cloud Peak (stopped monitoring during 2014)	IMPROVE	PM2.5, Nitrate, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide and Meteorology	1/3	- 106.9565	44.3335
Natrona	Casper	SLAMS	PM10 and PM 2.5	1/3	- 106.3256	42.8516
Sheridan	Sheridan-Highland Park	SLAMS	PM10 and PM2.5	1/3 (PM10); 1/3 and 1/6 (PM2.5)	- 107.0000	44.8060
	Sheridan-Police Station	SLAMS	PM10 and PM2.5	1/1 (PM10) and 1/3 & 1/6 (PM2.5)	- 107.0000	44.8330
	Sheridan	WARMS	PM2.5, Ozone, Nitrate, Ammonium, Nitric Acid, Sulfate and Sulfur Dioxide, Meteorology	1/3 (PM2.5) and 1/7 (others)	- 106.8472	44.9336
Weston	Newcastle	WARMS	PM2.5, Nitrate, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide and Meteorology, ozone	1/3 (PM2.5) and 1/7 (others)	- 104.1919	43.8731

	Newcastle	NADP <sup>5</sup>	Wet deposition of ammonium, sulfate, metals	Weekly	-104.1917	43.873
Park	Cody	SLAMS	PM10	Jan. 3	-109.073/44.532	
	North Absaroka (managed by USFS)	IMPROVE	PM2.5, NO3-, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	Jan. 3; Hourly Meteorology	-109.382/44.745	
	Yellowstone National Park – Tower Falls	NADP/NTN <sup>6</sup>	Wet Deposition Ions, Precipitation, pH	Weekly (Ions); Daily (Precip)	-110.42/44.917	
Fremont	Lander	SLAMS	PM2.5	Jan. 3	-108.733/42.833	
	Sinks Canyon	NADP/NTN	Wet Deposition Ions, Precipitation, pH	Weekly (Ions); Daily (Precip)	-108.85/42.734	
	South Pass City	NADP/NTN	Wet Deposition Ions, Precipitation, pH	Weekly (Ions); Daily (Precip)	-108.832/42.494	
Big Horn	Basin	WARMS CASTNET <sup>7</sup> <sub>et</sub>	Ozone, NO3-, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	Jan. 7 (Speciated); Hourly (O3, Met)	-108.041/44.28	
Campbell	Thunder Basin	SPM	Ozone, Nitrogen Oxides & Met	Hourly	-105.3/44.672	
	Thunder Basin	IMPROVE	PM2.5, NO3-, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	Jan. 3 (Speciated); Hourly Met.	-105.287/44.663	
Johnson	Buffalo	WARMS	PM2.5, NO3-, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	Jan. 3 (PM2.5); 1/7 (others); Hourly Met	-106.019/44.144	
	Cloud Peak (Monitoring stopped during 2014)	IMPROVE	PM2.5, NO3-, Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	Jan. 3 (Speciated); Hourly Met	-106.956/44.333	
Sublette	Boulder	SPM	O3, PM10, NO2	Hourly	-109.753/42.719	
Sublette	Daniel South	SPM	O3, PM10, NO2	Hourly	-110.055/42.791	
Sublette	Juel Spring	SPM	O3, NO2	Hourly	-109.563/42.373	
Sublette	Pinedale	SPM	O3, PM2.5, NO2	Hourly	-109.885/42.853	
Sweetwater	Moxa Arch	SPM	O3, PM10, NO2	Hourly	-109.788/41.751	
Sweetwater	Wamsutter	SPM	O3, PM10, NO2	Hourly	-108.024/41.678	
Fremont	South Pass	SPM	O3, PM10, NO2	Hourly	-108.720/42.528	
Uinta	Murphy Ridge	SPM	O3, PM10, NO2	Hourly	-111.042/41.369	
Teton	Jackson	SLAMS	PM10, PM2.5	1/3	-110.79799/43.45776	
Sweetwater	Rock	SLAMS	PM10, PM2.5	1/3	-109.22013/41.59259	

	Springs				
Laramie	Cheyenne	NCore	O <sub>3</sub> NO NO <sub>2</sub> SO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Hourly for all except 1/3 for PM <sub>2.5</sub>	-104.77842/41.18235

[1 -Special Purpose Monitor \(WDEQ-AQD\).](#)

[2 - State and Local Air Monitoring Stations \(WDEQ-AQD\).](#)

[3 - Wyoming Air Resource Monitoring System \(BLM-WY\).](#)

[4 - Interagency Monitoring of Protected Visual Environments \(Various Federal Agencies\).](#)

[5 - National Atmospheric Deposition Program \(Various Federal and State Agencies\).](#)

[6 - National Trends Network \(NADP\).](#)

[7 - Clean Air Status and Trends Network \(Environmental Protection Agency and BLM-WY\).](#)

### *Criteria Air Pollutants*

Criteria air pollutants are those for which national concentration standards have been established. If the air quality in a geographic area meets the NAAQS, it is designated an attainment area; areas that do not meet the NAAQS are designated nonattainment areas and must develop comprehensive state plans to reduce pollutant concentrations to a safe level. Attainment/nonattainment status is determined separately for each criteria pollutant. Five of the six criteria pollutants for which the EPA has established NAAQS are:

Carbon monoxide (CO): CO is an odorless, colorless gas formed during combustion of any carbon-based fuel, such as during the operation of engines, fireplaces, and furnaces. Because carbon monoxide data are generally collected only in urban areas where automobile traffic levels are high, recent data are often unavailable for rural areas.

Nitrogen dioxide (NO<sub>2</sub>): NO<sub>2</sub> is a highly reactive compound formed at high temperatures during fossil fuel combustion. During combustion, nitrogen monoxide (NO) is released into the air which reacts with oxygen in the atmosphere to form NO<sub>2</sub>. NO plus NO<sub>2</sub> forms a mixture of nitrogen gases, collectively called oxides of nitrogen (NO<sub>x</sub>). NO<sub>x</sub> emissions can convert to ammonium nitrate particles and nitric acid, which can cause visibility impairment and atmospheric deposition. NO<sub>x</sub> can contribute to “brown cloud” conditions and ozone formation, and can convert to ammonium (NH<sub>4</sub>), nitrate particles (NO<sub>3</sub>), and nitric acid (HNO<sub>3</sub>). Internal combustion engines are a major source of NO<sub>x</sub> emissions.

Ozone: Ozone is a gaseous pollutant that is not emitted directly into the atmosphere but is formed in the atmosphere from complex photochemical reactions involving NO<sub>x</sub> and reactive volatile organic compounds (VOCs). Common sources of VOCs include automotive and heavy equipment emissions, paints and varnishes, oil and gas operations, and wildfires. Ozone is a strong oxidizing chemical that can burn the lungs and eyes and damage plants. Ozone is a severe respiratory irritant at concentrations ~~in excess of~~ exceeding the federal standards.

Particulate matter (PM): PM is small particles suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Ambient air particulate matter standards are based on the size of the particle. The two types of particulate matter are:

PM<sub>10</sub> (particles with diameters less than 10 micrometers): small enough to be inhaled and capable of causing adverse health effects.

PM<sub>2.5</sub> (particles with diameters less than 2.5 micrometers): small enough to be drawn deeply into the lungs and cause serious health problems. These particles are a primary cause of visibility impairment.

Sulfur dioxide (SO<sub>2</sub>) and sulfates (SO<sub>4</sub>): SO<sub>2</sub> and SO<sub>4</sub> form during combustion from trace levels of sulfur in coal or diesel fuel. SO<sub>2</sub> also participates in chemical reactions and can form sulfates and sulfuric acid in the atmosphere.

The Wyoming DEQ has also established WAAQS, which are state-specific air quality standards for criteria pollutants. The standards and relevant averaging periods are summarized below:

**Table 2: NAAQS/WAAQS**

Pollutant	Averaging Time	National Ambient Air Quality Standards (NAAQS)			Wyoming Ambient Air Quality Standards (WAAQS)		
		Primary			Primary		
		(ppm)	(ppb)	(ug/m <sup>3</sup> )	(ppm)	(ppb)	(ug/m <sup>3</sup> )
Carbon Monoxide	1 hour	<b>35</b> <sup>(a)</sup>	35,000	40,000	<b>35</b>	35,000	40 (mg/m <sup>3</sup> )
	8 hour	<b>9</b> <sup>(a)</sup>	9,000	10,000	<b>9</b>	9,000	10 (mg/m <sup>3</sup> )
Lead	Rolling 3-month	---	---	<b>0.15</b>	---	---	<b>0.15</b>
Nitrogen Dioxide	1 hour	0.1	<b>100</b> <sup>(b)</sup>	189	0.1	<b>100</b>	189
	Annual (Arithmetic Mean)	0.053	<b>53</b>	100	0.053	<b>53</b>	100
PM <sub>10</sub>	24 hour	---	---	<b>150</b> <sup>(c)</sup>	---	---	<b>150</b>
	Annual (Arithmetic Mean)	None			---	---	<b>50</b>
PM <sub>2.5</sub>	24 hour	---	---	<b>35</b> <sup>(d)</sup>	---	---	<b>35</b>
	Annual (Arithmetic Mean)	---	---	<b>12.0</b> <sup>(e)</sup>	---	---	<b>12.0</b>
Ozone	8 hour	<b>0.070</b> <sup>(f)</sup>	70	147	<b>0.075</b>	75	147
Sulfur Dioxide	1 hour	0.075	<b>75</b> <sup>(g)</sup>	197	0.075	<b>75</b>	197
Hydrogen Sulfide	1/2 hour average	---	---	---	0.05	50	<b>70</b> <sup>(h)</sup>
	1/2 hour average	---	---	---	0.03	30	<b>40</b> <sup>(i)</sup>

Note: **Bold** indicates the standard as written in the corresponding regulation. Other values are conversions.

<sup>(a)</sup> Not to be exceeded more than once per year.

<sup>(b)</sup> To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).

<sup>(c)</sup> Not to be exceeded more than once per year on average over 3 years.

<sup>(d)</sup> To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m<sup>3</sup> (effective December 17, 2006).

<sup>(e)</sup> To attain this standard, the 3-year average of the weighted annual mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 12.0 µg/m<sup>3</sup>. (effective December 14, 2012)

<sup>(f)</sup> To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.070 ppm.

<sup>(g)</sup> To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb (effective June 22, 2010).

<sup>(h)</sup> not to be exceeded more than two times per year.

<sup>(i)</sup> not to be exceeded more than two times in any five consecutive days.

### Ozone

Ozone is formed in the lower atmosphere by a series of reactions involving sunlight and precursor emissions of nitrous oxide (NO<sub>x</sub>) and Volatile Organic Compounds (VOCs). Ozone and its precursors can be transported both into and out of the analysis region.

As mentioned above, the UGRB has been designated as a marginal nonattainment area for ozone. The designated nonattainment area includes Sublette County and portions of Lincoln and Sweetwater counties. This designation was based on ozone data for 2008 through 2010. Compliance with the 8-hour ozone NAAQS is based on the ozone

“design value,” which is defined as the 3-year average of the annual fourth-highest observed 8-hour average ozone concentration. An ozone design value is first calculated for each monitoring site within a given area. The area-wide ozone design value is then defined as the maximum over all sites within the area. If the design value exceeds the 8-hour ozone NAAQS of 70 parts per billion (ppb), the area is designated nonattainment.

Ozone is currently measured at several sites within southwestern Wyoming. All sites have sufficient data to calculate one or more 3-year design values. Ozone design values for each of these sites, for three recent 3-year design value periods (~~2013-2015, 2014-2016, and 2015-2017~~, 2015-2017, 2016-2018, and 2017-2019), are listed in the ~~table~~ Table 3, below. The general data trend in design values for all sites is ~~a either steady or increasing for the decrease from the 20125-20147 to the 20147-20169 design period, with an increase at all sites during the 2015-2017 design period. The figure after the table, below, displays 2010-2017 hourly ozone data from various Wyoming ozone monitors. This data shows no increasing or decreasing trend over the period. Figure 1 shows the maximum 8-hour daily 2009-2020 Basin, Wyoming WARMS Ozone data.~~

**Table 3: Ozone Design Values for Ozone Monitoring Sites in Wyoming Compared with the NAAQS**

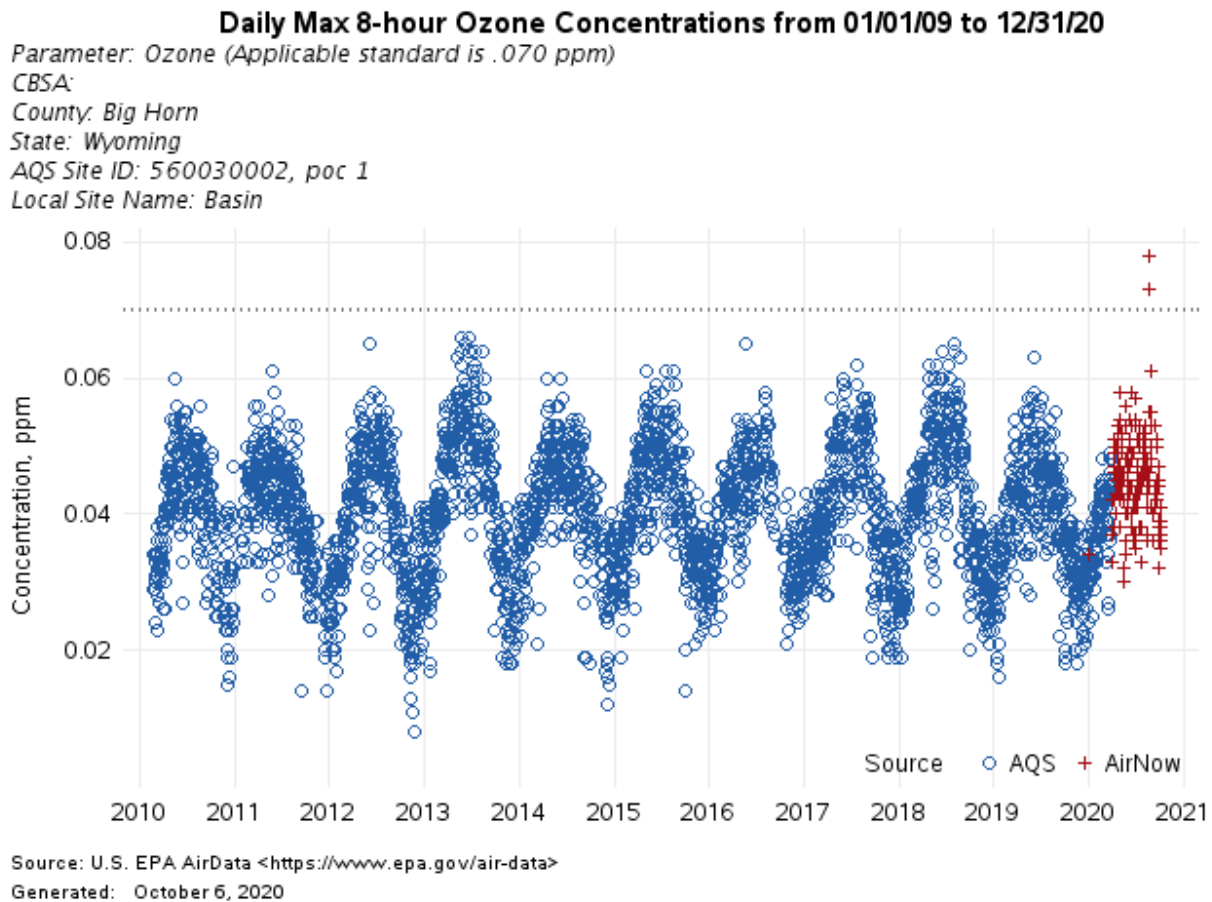
Site Name	ID	County	Ozone Design Value (ppb)			NAAQS (ppb)
			<del>20135-20157</del>	<del>20146-20168</del>	<del>20157-20179</del>	
Big Piney	56-035-0700	Sublette	<del>6164</del>	<del>6364</del>	<del>6363</del>	70
Boulder	56-035-0099	Sublette	<del>5858</del>	<del>6258</del>	<del>7262</del>	70
Cheyenne NCore	56-021-0001	Laramie	<del>6365</del>	<del>6363</del>	<del>6463</del>	70
Daniel South	56-035-0100	Sublette	<del>6262</del>	<del>6262</del>	<del>6262</del>	70
Juel Spring	56-035-0700	Sublette	<del>6062</del>	<del>6260</del>	<del>6662</del>	70
Moxa <u>Arch</u>	56-037-0300	Sweetwater	<del>6667</del>	<del>6766</del>	<del>6667</del>	70
Murphy Ridge	56-041-0101	Uinta	<del>6163</del>	<del>6264</del>	<del>6562</del>	70
Pinedale	56-035-0101	Sublette	<del>5859</del>	<del>6158</del>	<del>6464</del>	70
Thunder Basin	56-005-0123	Campbell	<del>5859</del>	<del>6058</del>	<del>6160</del>	70
Wamsutter	56-037-0020	Sweetwater	<del>5564</del>	<del>5355</del>	<del>5753</del>	70

Source: REF 1018

NAAQS National Ambient Air Quality Standards

ppb parts per billion

**Figure 1: Daily Max 8-hour Ozone Concentrations**



#### Ozone Nonattainment Designation

On April 30, 2012, the EPA formally recognized Wyoming's UGRB as an ozone nonattainment area with a marginal classification. As a result of the nonattainment designation, the BLM must comply with General Conformity regulations in 40 CFR 93 Subpart B and Chapter 8, Section 3 of the Wyoming Air Quality Standards and Regulations (WAQSR). Per these regulations, the BLM must demonstrate that new actions occurring within the nonattainment area will conform with the Wyoming State Implementation Plan (SIP) by demonstrating that they will not: (1) cause or contribute to a new violation of the ozone standard; (2) interfere with provisions in the SIP for maintenance of any standard; (3) increase the frequency or severity of any existing violation; or (4) delay timely attainment of any standard or any required interim emissions reductions or other milestone. The BLM must first conduct an applicability analysis to determine if this Federal action will require a conformity determination. A conformity determination must be completed for a Federal action if the total of direct and indirect emissions from the proposed project exceeds the *de minimis* levels specified in 40 CFR 93.153(b) and WAQSR Chapter 8, Section 3. For a marginal nonattainment area, the *de minimis* threshold is 100 tons/year of NO<sub>x</sub> or VOCs (the precursor pollutants that form ozone in the atmosphere). Federal actions estimated to have an annual net emissions increase less than the *de minimis* levels are not required to demonstrate conformity under the General Conformity regulations.

In accordance with the Federal and State Conformity regulations, the General Conformity requirement does not apply to actions where the emissions are not reasonably foreseeable such as lease sales made on a broad scale followed by exploration and development plans. There are no direct effects from the proposed oil and gas lease sale because it is primarily an administrative action that only conveys the mineral rights to the potential lessee. Subsequent development proposals by lease holders will require to submittal of plans for any exploration or

development that may occur and a site specific EA or EIS would be prepared to identify mitigation measures necessary to avoid undue degradation to the environment prior to approval any development activities. General Conformity is addressed at the proposal stage when emission generating activities are reasonably foreseeable and can be quantified. Six (6) parcels are located within this non-attainment area (parcels WY-204Q-0817, -0823, -0824, -0827, -6960 and -6961).

On August 27, 2015, the EPA published a Federal Register Notice finding that the Upper Green is attaining the ozone standard as of July 20, 2015 attainment date (see <http://www.gpo.gov/fdsys/pkg/FR-2015-08-27/pdf/2015-21196.pdf>). Formal re-designation of the area to attainment has not yet occurred.

#### *Nitrogen Dioxide*

Nitrogen dioxide (NO<sub>2</sub>) is currently measured at several monitoring sites across Wyoming. Relevant NAAQS for NO<sub>2</sub> include (1) the 1-hour NO<sub>2</sub> NAAQS, which requires the 3-year average of the 98<sup>th</sup> percentile daily maximum 1-hour NO<sub>2</sub> concentration to be less than 100 ppb; and (2) the annual NO<sub>2</sub> NAAQS, which requires the annual average NO<sub>2</sub> concentration to be less than 53 ppb. One-hour NO<sub>2</sub> design values for each of these sites, for [the 2013–2015, and 2014–2016, and 2015–2017, and 2017–2019 3-year design value periods](#) are listed in the [Table 4](#), below. Data from all sites show design values well below the NAAQS.

**Table 4: 1-Hour Design Values for NO<sub>2</sub> Monitoring Sites in Wyoming Compared with the NAAQS**

Site Name	ID	County	3-Year Average 98 <sup>th</sup> Percentile 1-Hour NO <sub>2</sub> (ppb)			NAAQS (ppb)
			<a href="#">2014- 20162013 -2015</a>	<a href="#">2015- 20172014 -2016</a>	<a href="#">2017- 20192015 -2017</a>	
Big Piney	56-035-0700	Sublette	<a href="#">8–</a>	<a href="#">88</a>	<a href="#">88</a>	100
Boulder	56-035-0099	Sublette	<a href="#">1214</a>	<a href="#">1412</a>	<a href="#">2114</a>	100
Cheyenne NCore	56-021-0001	Laramie	<a href="#">3536</a>	<a href="#">3235</a>	<a href="#">3332</a>	100
Daniel South	56-035-0100	Sublette	<a href="#">3–</a>	<a href="#">33</a>	<a href="#">43</a>	100
Juel Spring	56-035-0700	Sublette	<a href="#">1011</a>	<a href="#">910</a>	<a href="#">119</a>	100
Moxa <a href="#">Arch</a>	56-037-0300	Sweetwater	<a href="#">2020</a>	<a href="#">2020</a>	<a href="#">2020</a>	100
Murphy Ridge	56-041-0101	Uinta	<a href="#">1212</a>	<a href="#">1312</a>	<a href="#">1413</a>	100
Pinedale	56-035-0101	Sublette	<a href="#">2019</a>	<a href="#">2420</a>	<a href="#">2424</a>	100
Thunder Basin	56-005-0123	Campbell	<a href="#">89</a>	<a href="#">88</a>	<a href="#">78</a>	100
Wamsutter	56-037-0020	Sweetwater	<a href="#">3235</a>	<a href="#">3232</a>	<a href="#">3532</a>	100

Source: REF 1018

NAAQS National Ambient Air Quality Standards

NO<sub>2</sub> nitrogen dioxide

ppb parts per billion

### Sulfur Dioxide

Sulfur dioxide (SO<sub>2</sub>) is currently measured at the Moxa site (Sweetwater County) and the Cheyenne NCore site (Laramie County), ~~which. This site~~ was established in 2010. The corresponding SO<sub>2</sub> design values ~~for the are 17, 17, and 18 ppb for 2013–2015, 2014–2016, and 2015–2017, and 2017–2019 3-year design value periods are listed in Table 5 respectively, as listed in the table,~~ below. The SO<sub>2</sub> design values are well below the NAAQS.

**Table 5: Three-Year Average 99<sup>th</sup> Percentile Daily Maximum 1-Hour SO<sub>2</sub> Values for Monitoring Sites in Wyoming Compared with the NAAQS**

Site Name	ID	County	3-Year Average 99 <sup>th</sup> Percentile 1-Hour SO <sub>2</sub> (ppb)			NAAQS (ppb)
			<del>2014-2016</del> <del>2013-2015</del>	<del>2015-2017</del> <del>2014-2016</del>	<del>2017-2019</del> <del>2015-2017</del>	
Moxa <del>Arch</del>	56-037-0300	Sweetwater	<del>21</del> <del>18</del>	<del>21</del> <del>21</del>	<del>12</del> <del>21</del>	75
Cheyenne NCore	56-021-0100	Laramie	<del>9</del> <del>40</del>	<del>9</del> <del>9</del>	<del>5</del> <del>9</del>	75

Source: REF 1018

NAAQS National Ambient Air Quality Standards

ppb parts per billion

SO<sub>2</sub> sulfur dioxide

### Carbon Monoxide

Carbon monoxide (CO) is not routinely monitored within the region. CO was measured at the Murphy Ridge site (in Uinta County) during 2008. Based on these measurements, the daily maximum 1-hour CO value was 870 ppb (0.87 parts per million [ppm]) and the daily maximum 8-hour average CO value was 690 ppb (0.69 ppm). These values are well below the NAAQS limits of 35,000 and 9,000 ppb (35 and 9 ppm), respectively. Therefore, CO does not appear to be a pollutant of concern for the region. Note, however, that CO monitoring is limited to one site.

The 201~~4~~ National Emission Inventory ~~indicates~~~~indicated~~ that CO emissions in the region are primarily from area (mostly oil and gas-related) and on-road mobile sources. CO concentrations are expected to be greatest near human-made CO sources such as oil and gas development areas, population centers, and roadways, but CO is not a primary air quality concern for the region.

### Lead

Lead is not routinely monitored and is not a primary air quality concern for the region.

### Particulate Matter

Particulate matter, PM<sub>10</sub> and PM<sub>2.5</sub>, are pollutants of concern within the region. At the regional scale, it is expected that fugitive dust sources are the dominant contributors to PM<sub>10</sub> and PM<sub>2.5</sub> concentrations. Fugitive dust is likely to

occur naturally across the region, especially during high-wind events. Post-burn vegetative conditions associated with wildfires are also sources of fugitive dust. At the local level, concentrations are expected to be highest near towns, unpaved roads that experience high volumes of traffic, areas with depleted vegetative cover, and areas downwind of human-made sources of precursor emissions such as SO<sub>2</sub> and NO<sub>2</sub> that may react to form secondary PM<sub>2.5</sub>.

Recent PM<sub>10</sub> data are available for six monitoring sites within the region. Under the PM<sub>10</sub> NAAQS, the maximum 24-hour average PM<sub>10</sub> concentration cannot exceed 150 micrograms per cubic meter (µg/m<sup>3</sup>) more than once per year on average over 3 years. WDEQ also requires the annual PM<sub>10</sub> concentration to be less than 50 µg/m<sup>3</sup>. Maximum 24-hour PM<sub>10</sub> concentrations for monitoring sites within the area are listed in the [Table 6](#), below:

**Table 6: Maximum 24-Hour PM<sub>10</sub> Concentrations for Monitoring Sites in Wyoming Compared with the NAAQS**

Site Name	ID	County	Maximum 24-Hour Average PM <sub>10</sub> (µg/m <sup>3</sup> )				NAAQS (µg/m <sup>3</sup> )
			<del>2016</del> 2014	<del>2017</del> 2015	<del>2018</del> 2016	<del>2019</del> 2017	
Boulder	56-035-0099	Sublette	<del>4034</del>	<del>5540</del>	<del>8040</del>	<del>5526</del>	150
Cheyenne NCore	56-021-0100	Laramie	<del>3434</del>	<del>11778</del>	<del>5934</del>	<del>11765</del>	150
Daniel South	56-035-0100	Sublette	<del>2726</del>	<del>5536</del>	<del>8227</del>	<del>5421</del>	150
Gillette	56-005-1002	Campbell	<del>4025</del>	<del>4839</del>	<del>4440</del>	<del>4833</del>	150
Lander	56-013-1003	Fremont	<del>3062</del>	<del>4153</del>	<del>5030</del>	<del>4447</del>	150
Moxa <a href="#">Arch</a>	56-037-0300	Sweetwater	<del>4167</del>	<del>9453</del>	<del>8144</del>	<del>9421</del>	150
Murphy Ridge	56-041-0101	Uinta	<del>4239</del>	<del>5160</del>	<del>6442</del>	<del>5423</del>	150
Rock Springs	56-037-0007	Sweetwater	<del>4139</del>	<del>91</del> 54	<del>5041</del>	<del>3691</del>	150
Wamsutter	56-037-0020	Sweetwater	<del>3241</del>	<del>6147</del>	<del>4132</del>	<del>2561</del>	150

Source: REF 1018

NAAQS National Ambient Air Quality Standards

PM<sub>10</sub> particulate matter less than 10 microns in diameter

µg/m<sup>3</sup> micrograms per cubic meter

PM<sub>10</sub> concentrations are often heavily influenced by wildfire activity in the region as well as transport from areas outside of Wyoming. Therefore, while there are no violations of the PM<sub>10</sub> NAAQS, PM<sub>10</sub> is an air quality concern for the region.

Recent PM<sub>2.5</sub> data are available for two monitoring sites within the region. The NAAQS for PM<sub>2.5</sub> include (1) the 24-hour PM<sub>2.5</sub> NAAQS, which requires the 3-year average of the 98<sup>th</sup> percentile 24-hour average PM<sub>2.5</sub> concentration to be less than 35 µg/m<sup>3</sup>; and (2) the annual PM<sub>2.5</sub> NAAQS, which requires the 3-year average of the annual average PM<sub>2.5</sub> concentration to be less than 12 µg/m<sup>3</sup>. The 24-hour PM<sub>2.5</sub> design values are listed in the table, below, as are the annual PM<sub>2.5</sub> design values in the subsequent [Table 7](#).

**Table 7: 24-Hour PM<sub>2.5</sub> Design Values for Monitoring Sites in WY Compared with the NAAQS**

Site Name	ID	County	3-Year Average 98 <sup>th</sup> Percentile 24-Hour PM <sub>2.5</sub> (µg/m <sup>3</sup> ) ( <del>2015</del> - <del>2017</del> )	NAAQS (µg/m <sup>3</sup> )
Cheyenne NCore	56-021-0100	Laramie	<del>1411</del>	35
Lander	56-013-1003	Fremont	<del>2325</del>	35
Pinedale	56-035-0101	Sublette	<del>1618</del>	35
Rock Springs	56-037-0007	Sweetwater	19	35

Source: REF 1018

NAAQS	National Ambient Air Quality Standards
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in diameter
µg/m <sup>3</sup>	micrograms per cubic meter

**Table 8: Annual PM<sub>2.5</sub> Design Values for Monitoring Sites in Wyoming Compared with the NAAQS**

Site Name	ID	County	3-Year Average 98 <sup>th</sup> Percentile 24-Hour PM <sub>2.5</sub> (µg/m <sup>3</sup> ) ( <del>2015</del> <u>2017</u> - <u>2017</u> <u>2019</u> )	NAAQS (µg/m <sup>3</sup> )
Cheyenne NCore	56-021-0100	Laramie	<del>4.1</del> <u>3.2</u>	12
Lander	56-013-1003	Fremont	<del>6.8</del> <u>7.2</u>	12
Pinedale	56-035-0101	Sublette	<del>5.1</del> <u>4.6</u>	12
Rock Springs	56-037-0007	Sweetwater	<del>5.1</del> <u>5.1</u>	12

Source: REF 1018

NAAQS	National Ambient Air Quality Standards
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in diameter
µg/m <sup>3</sup>	micrograms per cubic meter

The 24-hour PM<sub>2.5</sub> design values are below the NAAQS for both sites. The annual PM<sub>2.5</sub> design values are also below the NAAQS for both sites ([Table 8](#)).

### 5.1.2 Climate – Affected Environment

The HDD is located in a semi-arid, mid-continental climate regime typified by dry, windy conditions, limited rainfall, and long, cold winters (Trewartha and Horn 1980). The HDD region is subject to strong, gusty winds that are often accompanied by snow and blizzard conditions during the winter. Winds frequently originate from the west to northwest, and the mean annual wind speed is 9 miles per hour but can have sustained winds greater than 40 miles per hour.

The climate in the HPD is generally temperate and is a semi-arid region with long cold winters and short summers. The major factors controlling climate in the planning area are elevation, strong westerly winds, moisture flow, and mountainous barriers to the west. Wind speed and direction are highly variable because of the effect of local topography in the planning area. Wind speeds are generally strong and gusts above 40 miles per hour are not unusual.

The climate in the WR/BBD is designated as a combination of Intermountain Semi-Desert and Southern Rocky Mountain Steppe. Summers are generally short and hot and winters long and cold. Precipitation has historically been low, though greater at higher elevations, and distributed across the year, with the exception of the drier summer months. Wind speeds are variable but strong.

In general, wind strength and frequency affects dispersion of noises, odors, and transport of dust and other airborne elements. Therefore, Wyoming's strong winds increase the potential for atmospheric dispersion of pollutants.

#### 5.1.2.1 Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. "Global warming" refers to the recent and ongoing rise in global average temperature near Earth's surface. It is caused mostly by increasing concentrations of greenhouse gases in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents

only one aspect of climate change. Climate is both a driving force and limiting factor for ecological, biological, and hydrological processes, and has potential to influence resource management.

The scientific community recognizes that global temperatures have risen at an increased rate and the likely cause is gases that trap heat in the atmosphere, referred to as GHGs. The Intergovernmental Panel on Climate Change (IPCC, 2007) concluded that “warming of the climate system is unequivocal” and “most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations.” Extensive research and development efforts are underway in the field of carbon capture and sequestration technology, which could help direct management strategies in the future. The IPCC has identified a target worldwide “carbon budget” to estimate the amount of CO<sub>2</sub> the world can emit while still having a likely chance of limiting global temperature rise to 2°C above pre-industrial levels. The international community estimates this budget to be 1 trillion tons of carbon and also acknowledges that varying amounts of this budget have already been consumed (IPCC, 2014).

In 2009, based primarily on the scientific assessments of the U.S. Global Change Research Program, the National Research Council, and the IPCC, the EPA issued a finding that the changes in our climate caused by elevated concentrations of GHGs in the atmosphere are reasonably anticipated to endanger the public health and public welfare of current and future generations. *See* Endangerment and Cause or Contribute Findings for Greenhouse Gases, 74 Fed. Reg. 66,496, 66,526 (Dec. 15, 2009) (“EPA Endangerment Finding”). In declining to control greenhouse gases from motor vehicles under the Clean Air Act (68 FR 52922, 52930), EPA cited the conclusion of the National Research Council’s 2001 report, Climate Change Science: An Analysis of Some Key Questions, to provide context as to how predicting climate change involves a “complex web of economic and physical factors,” including:

Our ability to predict future global anthropogenic emissions of GHGs and aerosols; the fate of these emissions once they enter the atmosphere (e.g., what percentage are absorbed by vegetation or are taken up by the oceans); the impact of those emissions that remain in the atmosphere on the radiative properties of the atmosphere; changes in critically important climate feedbacks (e.g., changes in cloud cover and ocean circulation); changes in temperature characteristics (e.g., average temperatures, shifts in daytime and evening temperatures); changes in other climatic parameters (e.g., shifts in precipitation, storms); and ultimately the impact of such changes on human health and welfare (e.g., increases or decreases in agricultural productivity, human health impacts)... Substantial scientific uncertainties limit our ability to assess each of these factors and to separate out those changes resulting from natural variability from those that are directly the result of increases in anthropogenic GHGs.

Early models of climate change had difficulty addressing the inherent uncertainty discussed in the 2001 NRC report, making their predictions of climate change effects from increasing concentrations of GHGs in the atmosphere, imperfect with varying levels of confidence. Newer models and assessments have become better in their ability to minimize some of this uncertainty but remain imprecise in being able to predict how, where and when those effects may manifest at multiple scales. The most recent analysis however, completed by the U.S. Global Change Research Program, is described in the 2017 Fourth National Climate Assessment. This report builds upon the 2007 IPCC finding that human influence likely has been the dominant cause of the observed warming since the mid-20<sup>th</sup> century, with the expanded conclusion: “Over the last century, there are no alternative explanations supported by the evidence that are either credible or that can contribute more than marginally to the observed patterns. There is no convincing evidence that natural variability can account for the amount of and the pattern of global warming observed over the industrial era.<sup>□</sup> Solar flux variations over the last six decades have been too small to explain the observed changes in climate.<sup>□</sup> There are no apparent natural cycles in the observational record that can explain the recent changes in climate (e.g., PAGES 2k Consortium 2013;<sup>□</sup> Marcott et al. 2013;<sup>□</sup> Otto-Bliesner et al. 2016<sup>□</sup>). In addition, natural cycles within Earth’s climate system can only redistribute heat; they cannot be responsible for the observed increase in the overall heat content of the climate system.”<sup>□</sup> (Footnotes omitted.)

*Statewide, National, and Global Climate Change (Temperature and Precipitation)*

According to the National Oceanic and Atmospheric Administration Climate Prediction Center<sup>3</sup>, “global mean surface temperatures increased nearly 1.8°F from 1890 to 2006. They further report that “the 2017 average global temperature across land and ocean surface areas was 0.84°C (1.51°F) above the twentieth-century average of 13.9°C (57.0°F), making it the third-warmest year on record behind 2016 (warmest) and 2015 (second warmest). Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24°N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone.”

The American Meteorological Society also produces annual State of the Climate Reports. Chapter 7 of the 2017 report, discloses:

[t]he annual average temperature in 2017 for the contiguous United States (CONUS) was 12.5°C or 1.0°C above the 1981–2010 average—its third warmest year since records began in 1895, 0.2°C cooler than 2016 and 0.4°C cooler than 2012 (Fig. 7.3). The annual CONUS temperature over the 123-year period of record is increasing at an average rate of 0.1°C decade, with the trend increasing since 1970 to 0.3°C decade.

The nationally averaged precipitation total during 2017 was 104% of average, the 20th wettest year in the historical record. The annual CONUS precipitation total is increasing at an average rate of 4.3 mm decade. Outside the CONUS, Alaska had its seventh warmest year (+1.2°C departure) since statewide records began in 1925, and near-median precipitation (104% of average).

Locations across the West, Great Plains, Great Lakes, Deep South, Midwest, and Northeast had a wetter-than-average year in 2017, while areas of the Northern Rockies and Plains were drier than average (Fig. 7.4b). Six states had annual precipitation totals above their 90th percentile, including Michigan, which was record wet, while only North Dakota was below its 10th percentile. Areas of the West, particularly California, experienced significant drought relief in early 2017, with a multiyear drought nearly eradicated due to the heavy winter precipitation. However, the wet winter allowed vegetation to flourish, creating an abundance of fuels for wildfires during the subsequent dry season. In the Northern Plains, a dry spring and summer set the stage for a rapidly expanding and intensifying drought. The year began and ended with about one-quarter of the contiguous U.S. in drought.

The CONUS winter precipitation was 120% of average, its wettest since 1997/98 and ninth wettest on record. Above-average winter precipitation occurred across the West and parts of the Northern Plains and Midwest. Nevada and Wyoming each had their wettest winter. Spring 2017 was tenth wettest for the CONUS, with 119% of average precipitation. Above-average precipitation occurred across the Northwest, Central Plains, Midwest, Northeast,

For the CONUS, ten months in 2017 were warmer than their respective 1981–2010 average. Every state, except Washington, had a warmer-than-average annual temperature (Fig. 7.4a). Arizona, Georgia, New Mexico, North Carolina, and South Carolina were each record warm.

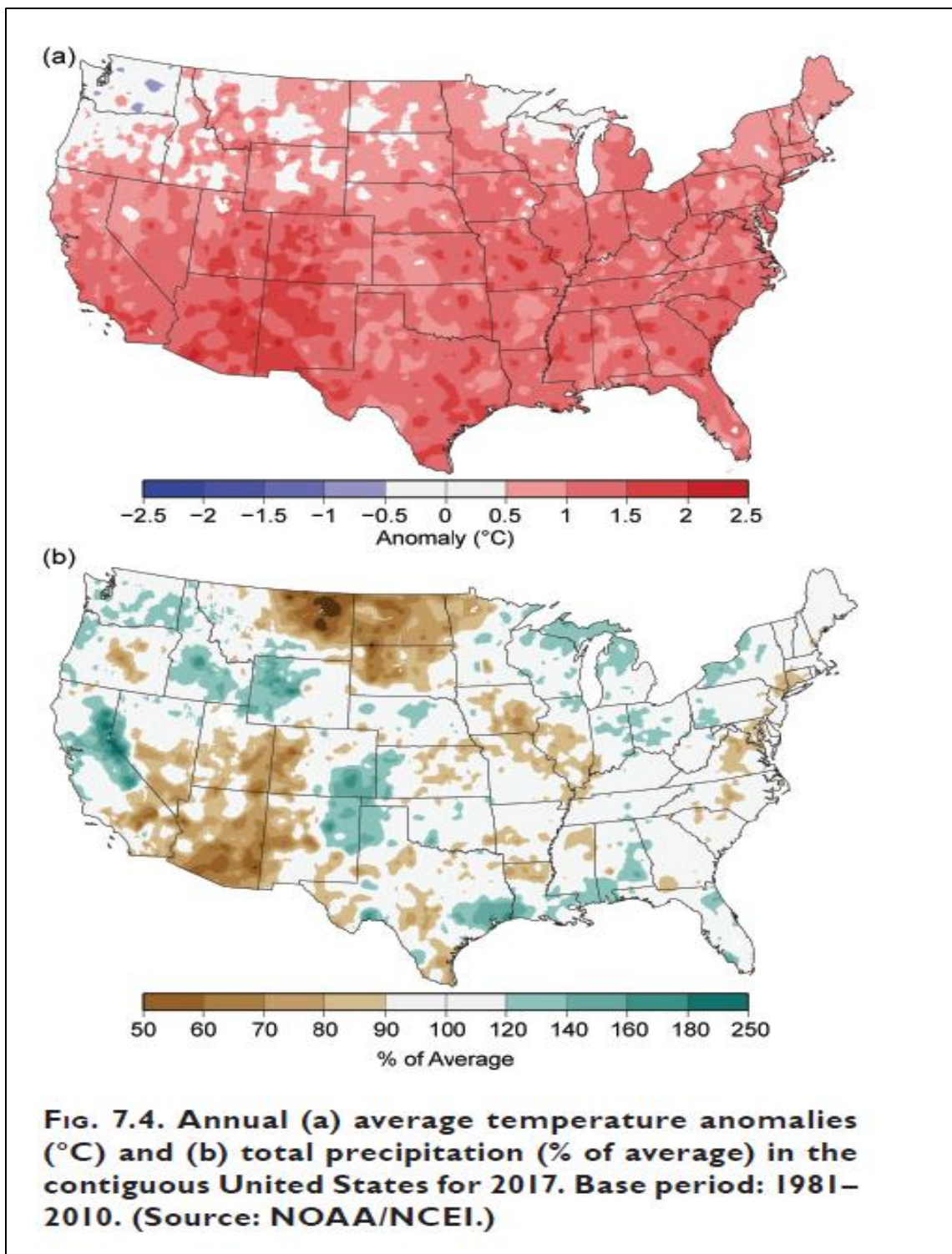
Specific to Wyoming, temperatures in western Wyoming are expected to increase by 0.25 to 0.40 degrees Fahrenheit per decade, while temperatures in surrounding locations in Utah, Wyoming, and Colorado are expected to increase by 0.40 to 1.2 degrees Fahrenheit per decade (see figure, below). Precipitation across western Wyoming is expected to decrease by 0.1 to 0.6 inches per decade with the largest decrease expected in southwestern Wyoming. The eastern portions of the state are expected to get warmer and wetter.

The following figure shows the deviation in Temperature and Precipitation from the average annual in the United States (State of the Climate Report, Chapter 7, page S195 (2017)).

---

<sup>3</sup> <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature> (accessed 04/05/2019)

**Figure 2: Deviation In Temperature and Precipitation From The Average Annual In The United States**

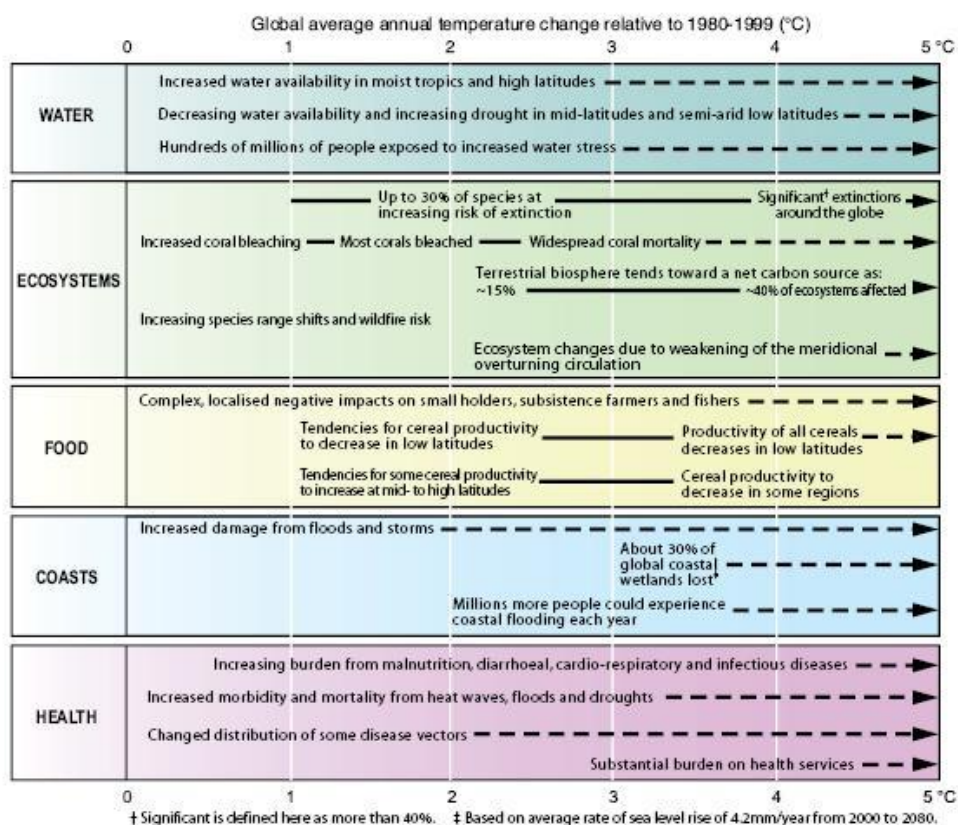


([https://www.ametsoc.net/sotc2017/Ch07\\_RegionalClimates.pdf](https://www.ametsoc.net/sotc2017/Ch07_RegionalClimates.pdf))

The next figure, taken from the IPCC's Fourth Assessment Report, indicates varying responses of the natural world to increasing temperatures as a result of increasing global temperatures.

**Figure 3: Examples of Impacts Associated with Global Average Temperature Change**

(Impacts will vary by extent of a adaptation, rate of temperature change and socio-economic pathway).



According to the Fourth National Climate Assessment, “Annual average temperature over the contiguous United States is projected to rise (*very high confidence*). Increases of about 2.5°F (1.4°C) are projected for the period 2021–2050 relative to 1976–2005 in all representative concentration pathway (RCP) scenarios, implying recent record-setting years may be “common” in the next few decades (*high confidence*). Much larger rises are projected by late century (2071–2100): 2.8°–7.3°F (1.6°–4.1°C) in a lower scenario (RCP4.5) and 5.8°–11.9°F (3.2°–6.6°C) in the higher scenario (RCP8.5) (*high confidence*).” It also predicts that: “Extreme temperatures in the contiguous United States are projected to increase even more than average temperatures. The temperatures of extremely cold days and extremely warm days are both expected to increase. Cold waves are projected to become less intense while heat waves will become more intense. The number of days below freezing is projected to decline while the number above 90°F will rise. (*Very high confidence*).”

### 5.1.2.2 Greenhouse Gas Emissions

In order to assess the potential for climate change, and the resultant effects of climate change, the standard approach is to measure and predict emissions of GHGs. Greenhouse gases are composed of molecules that absorb and re-radiate infrared electromagnetic radiation. When present in the atmosphere the gas contributes to the greenhouse effect. Some GHGs such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The primary GHGs that enter the atmosphere as a result of anthropogenic activities include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and fluorinated gases such as hydrofluorocarbons,

perfluorocarbons, and sulfur hexafluoride. Fluorinated gases are powerful GHGs that are emitted from a variety of industrial processes including production of refrigeration/cooling systems, foams and aerosols. Fluorinated gases are generally unrelated to the activities authorized by the BLM and will not be discussed further in this document.

GHGs are often presented using the unit of metric tons of CO<sub>2</sub> equivalent (mt CO<sub>2</sub>e) or Million Metric Tons (MMT CO<sub>2</sub>e), a metric to express the impact of each different greenhouse gas in terms of the amount of CO<sub>2</sub> making it possible to express greenhouse gases as a single number. For example, 1 ton of methane would be equal to 28 tons of CO<sub>2</sub> equivalent, because it has a GWP 28 times that of CO<sub>2</sub>. As defined by EPA, the GWP provides “ratio of the time-integrated radiative forcing from the instantaneous release of one kilogram of a trace substance relative to that of one kilogram of CO<sub>2</sub>.” The GWP of greenhouse gas is used to compare global impacts of different gases and used specifically to measure how much energy the emissions of one ton of gas will absorb over a given period of time (e.g. 100 years), relative to the emissions of one ton of CO<sub>2</sub>. The GWP accounts for the intensity of each GHGs heat trapping effect and its longevity in the atmosphere. The GWP provides a method to quantify the cumulative effects of multiple GHGs released into the atmosphere by calculating carbon dioxide equivalent for the GHGs.

- Carbon dioxide, by definition, has a GWP of 1 regardless of the time period used because it is the gas being used as the reference. CO<sub>2</sub> remains in the climate system for a very long time; CO<sub>2</sub> emissions cause increases in the atmospheric concentrations of CO<sub>2</sub> that will last thousands of years (EPA, 2016).
- Methane is estimated to have a GWP of 28-36 times that of CO<sub>2</sub> over 100 years depending upon the source. CH<sub>4</sub> emitted today lasts about a decade on average, which is much less time than CO<sub>2</sub>. But CH<sub>4</sub> also absorbs much more energy than CO<sub>2</sub>. The net effect of the shorter lifetime and higher energy absorption is reflected in the GWP. The methane GWP also accounts for some indirect effects, such as the fact that methane is a precursor to ozone, and ozone is in itself a greenhouse gas (EPA, 2016).
- Nitrous Oxide has a GWP of 298 times that of CO<sub>2</sub> for a 100-year timescale. N<sub>2</sub>O emitted today remains in the atmosphere for more than 100 years, on average (EPA, 2016).

#### *Reasonably Foreseeable Development (RFD) Scenario*

In order to analyze impacts of various alternatives in RMP EISs, the BLM develops Reasonably Foreseeable Development (RFD) projections that coincide with the lands in the planning area. Ultimately, the approved RMP is associated with a particular RFD for the lands that are open to oil and gas development, in consideration of the constraints placed on development under the RMP. Constraints include the various stipulations that can be attached to lease instruments. The EISs for the RMPs approved or amended in 2015 included updated RFDs. The RFD is the result of a technical analysis that projects the total number of wells that could be developed in a field office, based upon known geologic and economic conditions, current development technology, and industry-provided data about future planned development. The economic or technical viability of potential geologic plays were not revisited in the air analysis as they were accounted for in the development of the RFDs. The RFDs for the Wyoming planning areas are shown in the following table. The RFDs may include oil wells, gas wells, and Coalbed Natural Gas wells (CBNG) and are projections over the life of the plan, which is generally 20 years. This information indicates that on average, statewide, approximately 998 Federal wells could be developed annually.

**Table 9: Reasonably Foreseeable Well Development BLM Wyoming**

Planning Area	RFD Federal Mineral Estate (Number of Wells)	RFD All Mineral Ownership Lands (Number of Wells)	Total Federal Mineral Acreage Open to Leasing under RMP(s)
Lander FO <sup>4</sup>	1695	4254	2,640,000
Buffalo FO <sup>5</sup>	4767	11018	3,300,000
Bighorn Basin District <sup>6</sup> (Cody and Worland)	1141	6054	2,500,000
ARMPA <sup>7</sup>	12355	14818	22,100,000

While the above projections may include specific projections of CBNG development, the CBNG plays in Wyoming are not currently active and most CBNG wells are being plugged across the state; therefore, the RFD and any associated projection of emissions attributed to CBNG may be an overestimate. The status of existing CBNG development in each of the field offices is described below.

RFO: Production from CBNG wells is occurring within the RFO; approximately 8.5 percent of the active wells in the RFO are CBNG wells. Thus, based on the existing development and the RFD for the RFO, CBNG-related emissions can be expected.

KFO: Although the RFD for the KFO RMP assumes a CBNG development rate of up to 15 wells per year, there currently is no active or proposed CBNG development in the KFO; therefore, there are no expected emissions from CBNG.

PFO: Several CBNG wells were installed in the PFO, but have proven unproductive; therefore, no emissions are expected from this source, although they are included in the estimation of GHG emissions as the geologic potential still remains.

WR/BBD (Cody, Worland, and Lander Field Offices): CBNG production does not currently exist within the WR/BBD; a total of 14 CBNG wells have been installed in the LFO; all but one were plugged without producing in economical quantities. Although the RFD scenarios for both the LFO and Bighorn Basin RMPs assumes a CBNG development rate of up to 15 wells per year, there is no active or proposed CBNG development in the field offices; therefore, there are no expected emissions although they are included in the estimation of GHG emissions as the geologic potential still remains.

BFO: While some CBNG production still occurs in the BFO, the most current RFD projects no new Federal CBNG wells will be drilled/completed; active plugging operations of existing Federal and state wells are ongoing.

Development of oil and gas is ongoing and continues to be a major source of activity, and associated emissions, in Wyoming. Development density (wells per square mile) and number of wells installed annually depend on a number of variables including market trends, technology available (vertical, directional, or horizontal drilling), the geology of the hydrocarbon-bearing zone, and the application of Controlled Surface Use (CSU) and No Surface Occupancy (NSO) stipulations. As a result, the number of wells in these field offices that could potentially be put into production under a full-field development scenario for the leases is highly uncertain.

#### *Current Leasing and Drilling Activity*

At the end of fiscal year 2019, BLM Wyoming had 13,414 leases in effect, covering approximately 8.97 million acres. Of this total, 7,587 are in production [5,948 are held by actual production (3,626,642.4 acres) and 1,639 are held by allocated production (480,845.5 acres)]. The 7,587 leases that are in production contain approximately

<sup>4</sup> Lander RMP FEIS; Appendix T, pg 1649-1650.

<sup>5</sup> Buffalo RMP FEIS; Appendix G.

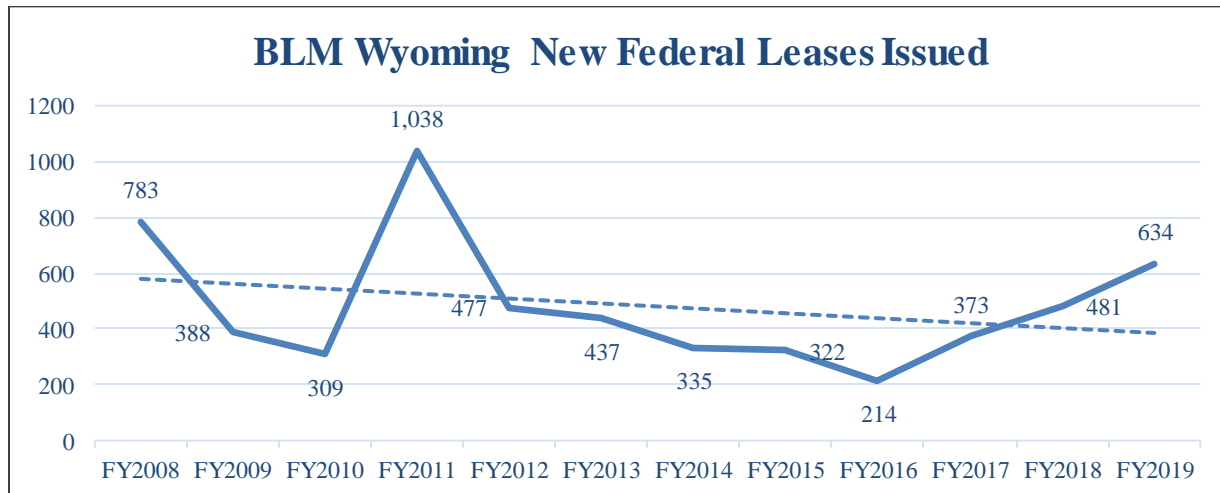
<sup>6</sup> Bighorn Basin FEIS at 4-107.

<sup>7</sup> ARMPA FEIS at 4-8.

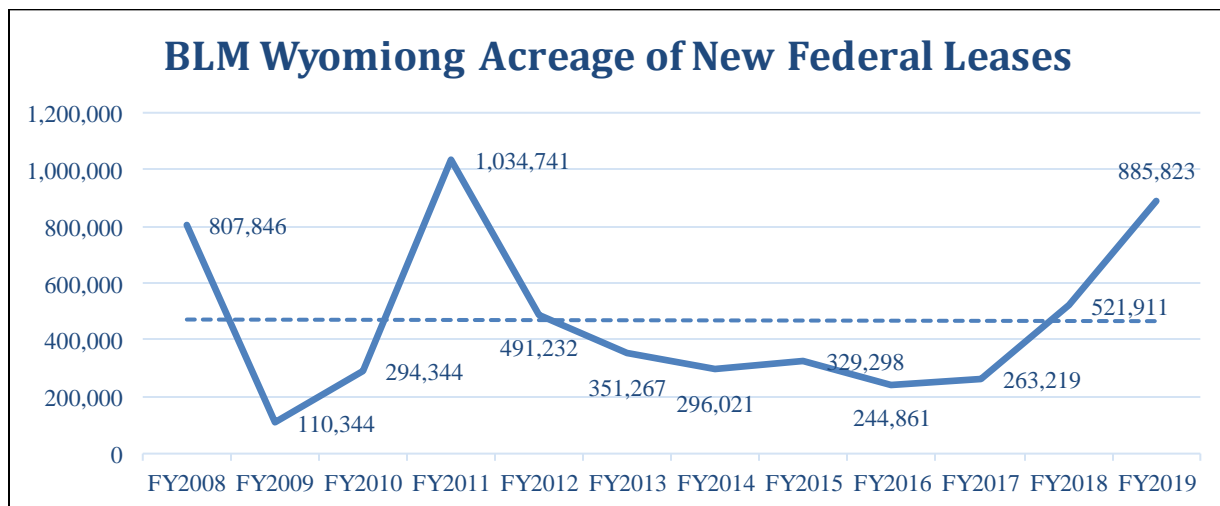
4,107,487.9 acres, or 45.8% of the total under lease. Over the last ten years, based on BLM Public Land Statistics<sup>8</sup>, approximately 49% of all leases, are in producing<sup>9</sup> status.

From FY2009 - FY2018, BLM-Wyoming issued an average of 437 leases per year. The average annual acreage leased was 393,792 acres. BLM Wyoming issued 634 new leases in FY2019 containing approximately 885,800 acres.

**Figure 4: BLM Wyoming New Federal Leases Issued 2008-2019**



**Figure 5: BLM Wyoming Total Acreage of New Federal Leases 2008-2019**



Similarly, from 2008 through 2018, an average of 745 wells were completed annually statewide. The total number of wells per year, per field office, can vary as economic conditions fluctuate and as new fields and drilling technologies are explored. From 2008 to 2018, the highest annual rate of well completions, and in total, has been in

<sup>8</sup> <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics>

<sup>9</sup> Production could be actual or allocated; allocated production means the lease is sharing in production from another lease, such as through a unit or communitization agreement. Actual production means that a well is producing directly from the Federal lease.

the PFO. Six of the leases addressed by this EA are in the PFO. The second highest rate of well completions has occurred within the Buffalo Field Office (BFO); one lease addressed in this EA is within the BFO.

**Table 10: BLM Wyoming Federal Well Activity (FY2009-FY2018)<sup>10</sup>**

BLM Wyoming Well Activity: 10/1/08 - 9/30/18					
Planning Document	Field Office	No. Approved Applications for Permit to Drill	No. Wells Started	No. Wells Completed for Production	Average Well Completions/year/per office
ARMPA	RSFO	253	222	226	22.6
	KFO	78	54	54	5.4
	PFO	3372	3230	3128	312.8
	RFO	647	557	577	57.7
	CFO	1956	871	554	55.4
	NFO	266	246	215	21.5
Buffalo RMP	BFO	2168	2208	2450	245
Lander RMP	LFO	188	152	131	13.1
Bighorn Basin RMP	CYFO	9	74	75	7.5
	WFO	5	55	36	3.6
Average over 10 years		894.2	766.9	744.6	(Average annual per field office) 74.46

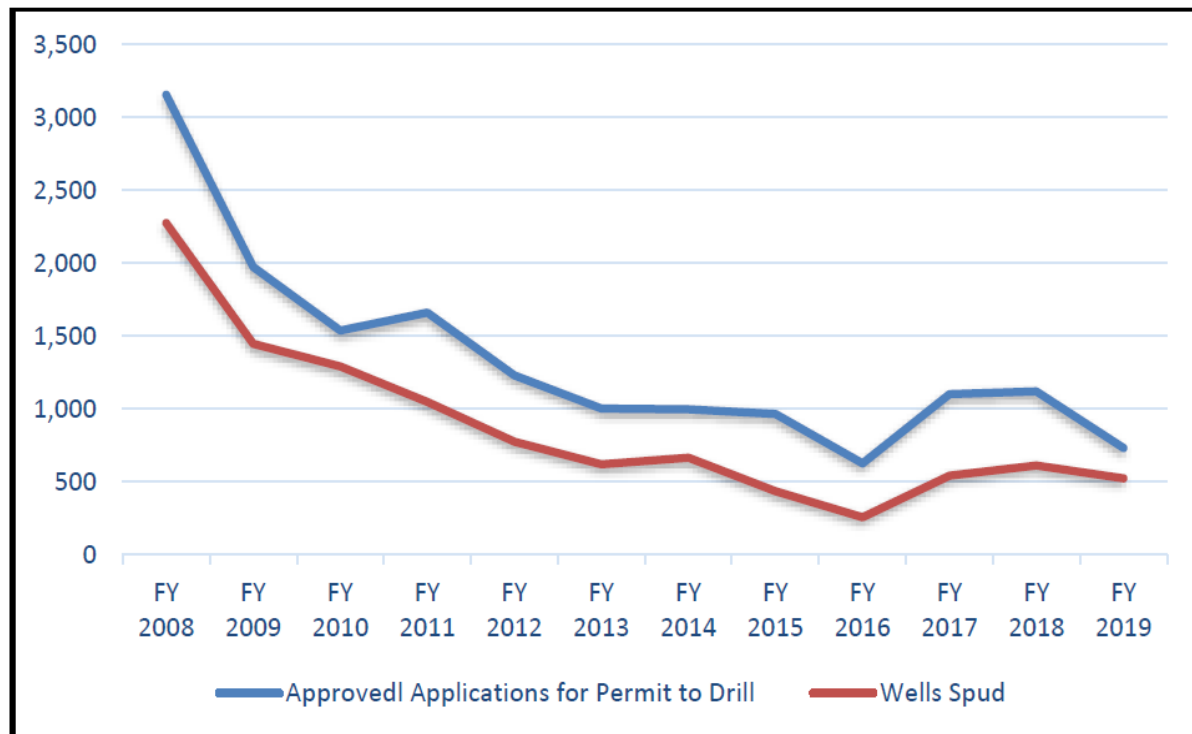
Based on the average wells per year projected under the planning area RFDs, well completion rates are well within the current RFD projection (998 wells per year) (see Table 9).

The number of usable completions in the BFO has decreased over time as the CBNG play has declines as discussed above, while new horizontal drilling rates have increased in the CFO, in the southern portion of the BFO, and in discrete areas of the RFO and PFO. The majority of new horizontal wells produce from multiple mineral estates (fee [private], state, Federal) due to the long reach of the wellbore and the large reservoir drainage area.

Similarly, as shown in the below figure, new wells spud and the total number of Applications for Permit to Drill that were approved on Federal lands in Wyoming, has decreased over time and is approximately 27% of the activity levels in 2008, although there was slight increase between 2016 and 2017. The increase in permits likely corresponds to improved economic conditions during this timeframe. Across the state, approximately 50% of the Federal Applications for Permit to Drill that are approved are actually started.

<sup>10</sup> <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics>

**Figure 6: BLM Wyoming Federal Applications For Permit to Drill Approvals and Federal Well Starts (Spuds)<sup>11</sup>**



Based on the above information on well development, the RFD is a valid estimate of future well development for Federal lands in Wyoming.

#### *Statewide GHG Emission Levels*

Outside of coal development, oil and gas development is the single largest contributor to total air pollutant emissions in Wyoming compared to other management activities. The Center for Climate Strategies (CCS) prepared the Wyoming Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Spring, 2007), for the Wyoming Department of Environmental Quality through an effort of the Western Regional Air Partnership. The CCS inventory report presents a draft GHG emissions inventory and forecast from 1990 to 2020 for all Federal and Non-Federal emission-generating activities in Wyoming. This report provides an initial comprehensive understanding of Wyoming's current and possible future CO<sub>2</sub>e emissions. The information presented provides a starting point for estimating statewide emissions, as the initial estimates may be revised as improvements to data sources and assumptions are identified.

The CCS inventory report explains that all GHG-emission generating and consumptive activities in Wyoming accounted for approximately 56 MMT of gross CO<sub>2</sub>e emissions in 2005, an amount equal to 0.8% of total U.S. gross GHG emissions. These emission estimates focus on activities in Wyoming and are consumption-based<sup>12</sup>; they exclude consumptive emissions associated with electricity that is consumed by users not in Wyoming. The report concludes that Wyoming's gross GHG emissions increased 25% from 1990 to 2005, while national emissions rose by only 16% from 1990 to 2004; annual sequestration (removal) of GHG emissions due to forestry and other land-uses in Wyoming is estimated at 36 MMT CO<sub>2</sub>e in 2005. The increase in per capita emissions in Wyoming is

<sup>11</sup> <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics>

<sup>12</sup> "The emissions inventory generally includes estimates of electricity generation and in-state consumption, transportation related consumption, manufacturing consumption, and specific to the oil and gas industry include production, processing, transmission, and distribution of fossil fuels and through the consumption of energy by the residential, commercial and industrial sectors of Wyoming economy."

mostly due to increased activity in the fossil fuel industry, while national per capita emissions have changed relatively little.

The analysis in the report indicates that Wyoming's per capita emission rate is more than four times greater than the national average of 25 MMT CO<sub>2</sub>e/yr. This large difference between national and state per capita emissions occurs in most of the sectors, including: electricity, industrial, fossil fuel production, transportation, industrial process and agriculture. The reasons for the higher per capita intensity in Wyoming are varied, but include the state's strong fossil fuel production industry and other industries with high fossil fuel consumption intensity, large agriculture industry, large distances, and low population base. While the information in the CCS report is from 2005, no updates are available and the report remains the best available synthesis of potential and future GHG emissions in Wyoming.

The Wyoming CCS inventory report also explains that emissions from the fossil fuel sector grew 101% from 1990 to 2005, largely attributable to the tight sand gas play in Western Wyoming, and the CBNG boom that occurred in the Powder River Basin. The report projected that these emissions would increase by a further 10% between 2005 and 2020 (if economic incentives remain).<sup>13</sup> The natural gas industry is the major contributor to both GHG emissions and emissions growth, with CH<sub>4</sub> emissions from coal mining are second in terms of overall contribution. A significant portion of the emissions attributed to the natural gas industry are due to vented gas from processing plants, many of which are used for injection in enhanced oil recovery operations.

The U.S. Energy Information Administration (EIA) is one of the primary agencies in charge of producing energy outlook forecasts for the U.S. Government. Within its forecasts, the EIA includes Wyoming within the Rocky Mountain Region, which also includes Colorado, Utah, Idaho, Nevada, Arizona and portions of New Mexico. Wyoming also borders Montana, which is part of the Northern Great Plains Region; the Northern Great Plains Region also includes North and South Dakota. In discussing regional oil and gas trends, Wyoming's contribution to the oil and gas industry, and associated GHG emissions, they should be evaluated in the context of these two assessment areas. As discussed in the EIA's Assumptions to the Annual Energy Outlook: 2019: Oil and Gas Supply Module, total technically recoverable oil volumes in these two regions is 51.3 Billion barrels (BBL); the Rocky Mountain region is expected to contribute 24.9 BBLS and the Northern Great Plains region is expected to contribute 26.4 BBLS. Similarly for dry natural gas, these two regions are thought to contain a total of approximately 357.4 trillion cubic feet (tcf) of technically recoverable natural gas; of this total, the Rocky Mountain Region is estimated to contain 314.8 tcf and 42.6 tcf in the Northern Great Plains Region.

Specific to the State of Wyoming, the EIA estimates that current recoverable reserves, as of December 31, 2017, are 22,352 billion cubic feet of wet gas, and 1,119 million barrels of crude oil plus lease condensate.

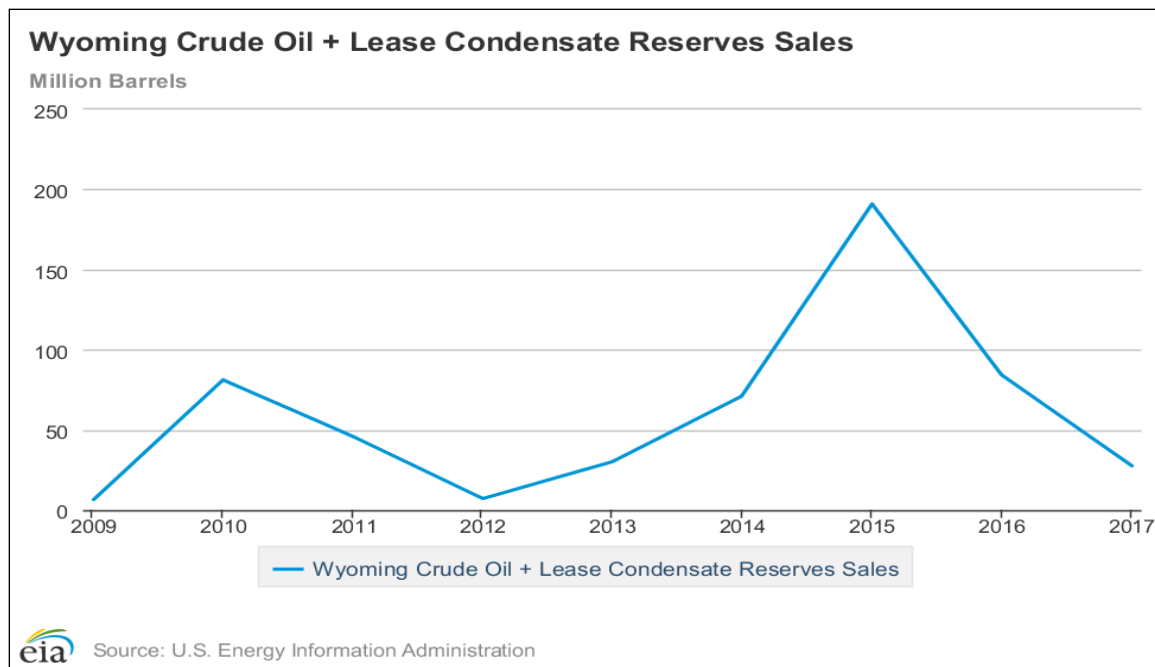
The following figure shows total Wyoming Crude Oil plus Lease Condensate Reserves Sales from 2009 to present<sup>14</sup>:

---

<sup>13</sup> As discussed on page 18 above, the economic incentive for CBNG is no longer in play, and plugging of existing wells is ongoing.

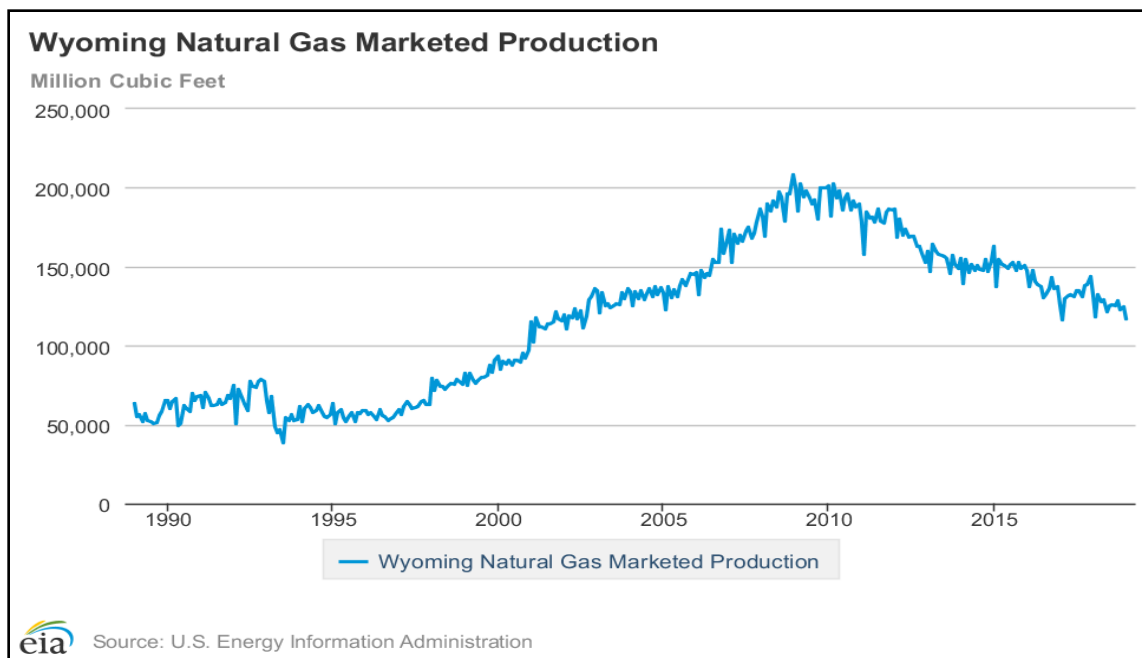
<sup>14</sup> [https://www.eia.gov/dnav/ng/hist/res\\_epccond\\_r05\\_swy\\_mmbbl.htm](https://www.eia.gov/dnav/ng/hist/res_epccond_r05_swy_mmbbl.htm) (accessed 04/05/2019)

**Figure 7: Total Wyoming Crude Oil plus Lease Condensate Reserves Sales From 2009 to 2017**



Similarly, the following figure shows total marketed natural gas from 1990 to present<sup>15</sup>:

**Figure 8: Total Wyoming Natural Gas Marketed Production 1990 to Present**



<sup>15</sup> <https://www.eia.gov/dnav/ng/hist/n9050wy2m.htm> (accessed 04/04/2019)

### *Statewide<sup>16</sup> and Nationwide Federal Lands*

In 2018, the U.S. Geological Survey (USGS) produced a Scientific Investigations Report (SIR) at the request of BLM: Federal Lands Greenhouse Gas Emissions and Sequestration in the United States—Estimates for 2005–14.<sup>17</sup> The USGS SIR presents gross GHG emission estimates for all Federal mineral estates in the U.S., and each of the states which contain Federal minerals, including those within the Rocky Mountain and Northern Great Plains regions. The USGS SIR reports the following:

*The emissions estimates span a 10-year period (2005–2014) and are reported for 28 States and two offshore areas. Nationwide emissions from all fossil fuels produced on Federal lands in 2014 were 1,279.0 MMT (1,279,000,000 mt) of CO<sub>2</sub>e for carbon dioxide (CO<sub>2</sub>), 47.6 MMT CO<sub>2</sub>e for methane (CH<sub>4</sub>), and 5.5 MMT CO<sub>2</sub>e for nitrous oxide (N<sub>2</sub>O). Compared to 2005, the 2014 totals represent decreases in emissions for all three greenhouse gases (decreases of 6.1 percent for CO<sub>2</sub>, 10.5 percent for CH<sub>4</sub>, and 20.3 percent for N<sub>2</sub>O). Emissions from fossil fuels produced on Federal lands represent, on average, 23.7 percent of national emissions for CO<sub>2</sub>, 7.3 percent for CH<sub>4</sub>, and 1.5 percent for N<sub>2</sub>O over the 10 years included in this estimate.*

The report also found that of the total nationwide emission estimate for Federal minerals (1,279.53 MMT), Federal lands in Wyoming contributed approximately 727,700,000 mt (727.7 MMT) (57%) of CO<sub>2</sub>e in 2014. Compared to these nationwide Federal totals, in 2014 Wyoming's Federal direct emissions from extractive activities in oil and natural gas systems were 9,089,000 mt (9.089 MMT) CO<sub>2</sub>e,<sup>18</sup> and indirect emissions from stationary combustion activities totaled 75,180,800 mt (75.1808 MMT). By contrast, in 2014, coal mining on Federal lands in Wyoming, contributed approximately 3,800,000 mt (3.8 MMT) CO<sub>2</sub>e<sup>19</sup>, and combustion emissions from coal use and mobile combustion make up the remainder.<sup>20</sup>

From 2005 through 2014, 2008 had the highest CO<sub>2</sub>e emissions in Wyoming from Federal fossil fuel development, when the total was 889,500,000 mt (889.5 MMT). Overall, nationwide emissions from Federal lands decreased from 2005 levels in 2014: “The 2014 totals represent decreases in emissions for all three greenhouse gases compared to 2005 values, with reductions of 6.1 percent for CO<sub>2</sub>, 10.5 percent for CH<sub>4</sub>, and 20.3 percent for N<sub>2</sub>O.”

The SIR also reports the following:

*In general, as of 2014, Wyoming, offshore Gulf, New Mexico, Louisiana, and Colorado had the highest CO<sub>2</sub> emissions from fuels produced on Federal lands (fig. 2). The CO<sub>2</sub> emissions attributed to Federal lands in Wyoming are 57 percent of the total from Federal lands in all States and offshore areas combined. Emissions estimates for the release of CH<sub>4</sub> are also highest for Federal lands in Wyoming (28 percent), followed by New Mexico, offshore Gulf, Colorado, and Utah (fig. 3).*

*Unsurprisingly, the trends and relative magnitudes of the emissions estimated are roughly parallel to the Federal lands production volumes (U.S. Energy Information Administration, 2015a). States that produced the most fuel from Federal lands are associated with the highest emissions for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. These relationships vary slightly relative to absolute production because different fuels require different extraction methods and fuel uses emit varying amounts of greenhouse gases.*

---

<sup>16</sup> As it relates to information presented in the USGS SIR, and the WOGCC calculations, the emissions are based on raw production information (rather than being produced from a well-emission factor through an air quality analysis which would have included specific BTU and therm information), they are generally presented in total CO<sub>2</sub> even though the EPA Equivalency Calculator will report them as CO<sub>2</sub>e. All Proposed Action calculated indirect emission estimates presented in this EA were calculated using the EPA equivalency calculator and are presented as CO<sub>2</sub>e. Regional emission comparisons in Section 4.0 are also presented in CO<sub>2</sub>e, even though they are reported as CO<sub>2</sub> in the USGS SIR, for consistencies sake.

<sup>17</sup> <https://pubs.er.usgs.gov/publication/sir20185131> (accessed 3/22/2019)

<sup>18</sup> Extractive emissions are defined as (at 22) “Emissions of greenhouse gases from ongoing extraction activities and product transportation in the petroleum and natural gas industries”, and stationary combustion emissions are “greenhouse gases produced during the combustion of fossil fuels in all nontransportation sectors, including electricity generation, industrial feedstocks, and residential and commercial heating.”

<sup>19</sup> The Buffalo RMP FEIS (at 694), estimates that in the year 2024 (year of peak emissions), direct GHG's from future coal mining in that planning area could be 10,157,051 mt tons of CO<sub>2</sub>e; the Buffalo field office has the largest share of coal production in the continental U.S.

<sup>20</sup> <https://eerscmap.usgs.gov/fedghg/>

While the USGS SIR reports that total emissions from all fossil fuel development on Federal lands in Wyoming totaled approximately 727,700,000 mt/yr, it also notes that approximately 26,200,000 mt (26.2 MMT) is sequestered by natural resources, such that the net total CO<sub>2</sub> emissions from fossil fuel production in Wyoming is 701,500,000 mt (701.5 MMT).

Using 2014 production information from the Wyoming Oil and Gas Commission<sup>21</sup> (WOGCC), BLM calculated that total estimated indirect CO<sub>2</sub>e emissions from all (Federal, state, fee[private]) oil and gas production in the state was approximately 140,100,000 mt (140.1 MMT CO<sub>2</sub>e), where total oil production was 75,706,328 BBLs and natural gas production was 1,966,535,934 million cubic feet (Mcf).<sup>22</sup> This is approximately 11% of the total 1,279.0 MMT described in the USGS SIR. In 2018, also based on WOGCC production information for all lands, total indirect CO<sub>2</sub>e was 140,100,000 mt (total oil production 86,639,046 BBLs, total natural gas production 1,800,638,867 Mcf).<sup>23</sup>

### National GHG Emissions

EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018<sup>24</sup> discusses total U.S. CO<sub>2</sub> emissions:

*In 2018, total gross U.S. greenhouse gas emissions were 6,676.6 million metric tons carbon dioxide equivalent (MMT CO<sub>2</sub> Eq.). Total U.S. emissions have increased by 3.7 percent from 1990 to 2018, down from a high of 15.2 percent above 1990 levels in 2007. Emissions increased from 2017 to 2018 by 2.9 percent (188.4 MMT CO<sub>2</sub> Eq.). Net emissions (i.e., including sinks) were 5,903 MMT CO<sub>2</sub> Eq. Overall, net emissions increased 3.1 percent from 2017 to 2018 and decreased 10.2 percent from 2005 levels as shown in Table 2-1. The decline reflects many long-term trends, including population, economic growth, energy market trends, technological changes including energy efficiency, and energy fuel choices. Between 2017 and 2018, the increase in total greenhouse gas emissions was driven largely by an increase in CO<sub>2</sub> emissions from fossil fuel combustion. The increase in CO<sub>2</sub> emissions from fossil fuel combustion was a result of multiple factors, including increased energy consumption from greater heating and cooling needs due to a colder winter and hotter summer in 2018 compared to 2017.*

**Table 2-1: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks (MMT CO<sub>2</sub> Eq.)**

Gas/Source	1990	2005	2014	2015	2016	2017	2018
CO <sub>2</sub>	5,128.3	6,131.9	5,561.7	5,412.4	5,292.3	5,253.6	5,424.9
Fossil Fuel Combustion	4,740.0	5,740.7	5,184.8	5,031.8	4,942.4	4,892.2	5,031.8
Transportation	1,469.1	1,856.1	1,713.7	1,725.3	1,765.3	1,787.3	1,820.7
Electric Power	1,820.0	2,400.0	2,037.1	1,900.6	1,808.9	1,732.0	1,752.8
Industrial	857.0	850.1	812.9	801.3	801.4	805.0	833.2
Residential	338.2	357.9	346.8	317.8	293.1	293.8	337.3
Commercial	228.2	226.9	232.8	245.4	232.3	232.8	246.5
U.S. Territories	27.6	49.7	41.4	41.4	41.4	41.4	41.4
Non-Energy Use of Fuels	119.5	139.7	120.0	127.0	113.7	123.1	134.6
Iron and Steel Production & Metallurgical Coke Production	104.7	70.1	58.2	47.9	43.6	40.6	42.6
Cement Production	33.5	46.2	39.4	39.9	39.4	40.3	40.3
Petroleum Systems	9.6	12.2	30.5	32.6	23.0	24.5	36.8
Natural Gas Systems	32.2	25.3	29.6	29.3	29.9	30.4	35.0
Petrochemical Production	21.6	27.4	26.3	28.1	28.3	28.9	29.4
Ammonia Production	13.0	9.2	9.4	10.6	10.8	13.2	13.5
Lime Production	11.7	14.6	14.2	13.3	12.6	12.8	13.2
Incineration of Waste	8.0	12.5	10.4	10.8	10.9	11.1	11.1
Other Process Uses of Carbonates	6.3	7.6	13.0	12.2	10.5	9.9	10.0
Urea Fertilization	2.0	3.1	3.9	4.1	4.0	4.5	4.6

Trends 2-3

<sup>21</sup> <http://pipeline.wyo.gov/StatsForState.cfm?oops=ID96179>

<sup>22</sup> Volumes converted to CO<sub>2</sub>e using EPA greenhouse gas calculator.

<sup>23</sup> <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

<sup>24</sup> <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018> (accessed 4/14/2020)

The information presented by the EPA Inventory coincides well with information contained in a report prepared by the International Energy Agency, Global Energy and CO<sub>2</sub> Status (March, 2019),<sup>25</sup> which found:

*[I]n 2015, natural gas emissions surpassed coal emissions, and the Annual Energy Outlook 2019 (AEO2019) Reference case projects that natural gas CO<sub>2</sub> emissions will continue increasing as natural gas use increases. The U.S. electric power sector—now the largest consuming sector for natural gas—has added generating capacity from natural gas in recent years and has used those power plants more often. Natural gas surpassed coal to become the most prevalent fuel used to generate electricity in the United States in 2016.*

*Other sectors have also increased their consumption of natural gas. By the mid-2020s, EIA projects that the industrial sector will again become the largest consumer of natural gas, using natural gas as a feedstock in chemical industries, as lease and plant fuel, for industrial heat and power applications, and for liquefied natural gas production. The residential and commercial sectors are also expected to continue using more natural gas. For instance, EIA projects that natural gas furnaces and boilers will be used in 55% of U.S. homes in 2050, an increase from their 49% share in 2018.*

*Coal CO<sub>2</sub> emissions in the United States are almost all from the electric power sector. Only about 10% of coal CO<sub>2</sub> emissions came from the industrial sector in 2018, and this percentage is expected to remain the same through 2050. Although the AEO2019 Reference case projects that nearly one-third of the existing coal-fired electricity generating capacity retires within the next decade, the surviving fleet is used more often, meaning coal's projected decline in electricity generation is less than the capacity retirements would suggest.*

### 5.1.3 Air Quality – Environmental Impacts

Refer to Sections 4.2 (page 4-5) and 4.22.3 of the ARMPA (beginning on page 4-488 for a discussion of potential impacts to Air Quality, and related values for the HDD, the CFO and the NFO. Refer to Section 4.2.4 (beginning on page 4-7) of the ARMPA FEIS for a discussion of potential impacts to air quality resulting from oil and gas development, including potential greenhouse gas emissions. The air emissions projections within the ARMPA for oil and gas development were calculated using the latest emissions estimates data from the BFO and LFO EISs (BLM 2010).

See Section 4.1.1 of the BFO RMP FEIS (beginning on page 650), Section 4.1.1 of the Bighorn Basin RMP FEIS (beginning on page 4-6), Section 4.1.1 of the LFO FEIS (beginning on pg. 593) for specific air quality impact analysis in these planning areas.

Additional information regarding air quality related values including Visibility, Hazardous Air Pollutants (HAPs) and Deposition is located in Appendix 5.6.

The administrative act of offering any of these parcels and the subsequent issuing of leases would have no direct impacts to air quality. Any potential effects to air quality would occur if the leases are developed. Any proposed development project would be subject to additional analysis of possible air effects before approval, when necessary. Potential impacts of development could include increased airborne particulates associated with the construction of new well pads, pipelines, or roads, exhaust emissions from drilling and completion equipment/activities, compressors, vehicles, and dehydration and separation facilities, as well as releases of GHG and volatile organic compounds during many of these activities. The following sources of emissions are anticipated during oil and gas development should the leases be sold and development proposed and found to be economic:

- combustion engines (e.g., fossil fuel-fired internal combustion engines used to supply electrical or hydraulic power for hydraulic fracturing to drive the pumps and rigs used to drill the well, drill out the hydraulic stage plugs and run the production tubing in the well; generators to power drill rigs, pumps and

<sup>25</sup> <https://www.eia.gov/todayinenergy/detail.php?id=38773> (accessed 04/01/2019)

other equipment; compressors used to increase the pressure of the oil or gas for transport and use; tailpipe emissions from vehicles transporting equipment to the site),

- venting (e.g., fuel storage tanks, vents, and pressure control equipment),
- mobile emissions (e.g., vehicles bringing equipment, personnel or supplies to the location), and
- fugitive sources (e.g., pneumatic valves, tank leaks, dust).

Pollutants associated with the combustion of fossil fuels anticipated to be released during drilling/completion operations include: CO, NO<sub>x</sub>, SO<sub>x</sub>, PM, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. Venting may release VOCs/HAPs, H<sub>2</sub>S, and CH<sub>4</sub>. The amount of increased emissions cannot be quantified at this time since it is unknown how many wells or what type (oil, gas or both) may be proposed for development, the types of equipment needed if a well were to be put into production (e.g., compressor, separator, dehydrator), or what technologies may be employed by a given company. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs.

During the completion phase, the principal pollutants emitted are VOCs, HAPs, particulate matter and NO<sub>2</sub>. VOCs and NO<sub>x</sub> contribute to the formation of ozone. During well completion, injected fracturing fluids, formation fluids and reservoir gas are flowed back to the surface. The flowback of formation fluids and reservoir gas will include additional VOCs and methane, along with hazardous air pollutants such as benzene, ethylbenzene, and n-hexane. Pollution also may be emitted from other processes and equipment during production and transportation of oil and gas from the well to a processing facility. Refer to Appendix 5.9, (Hydraulic Fracturing White Paper) for more information, which is incorporated by reference.

#### **5.1.4 Greenhouse Gas Emissions and Climate Change – Environmental Impacts**

Quantitative assessment of impacts is necessarily limited by uncertainties regarding the number, nature, and specific location of resources and proposed future activities. In general, however, oil and gas leasing may lead to the installation and production of new wells, which may consequently result in direct GHG emissions associated with installing and producing new wells, and indirect emissions associated with any downstream use of any lease product. The primary sources of GHG emissions from these processes include the following:

- Fossil fuel combustion for construction and operation of oil and gas facilities – e.g., vehicles driving to and from production sites, engines that drive drill rigs. These produce CO<sub>2</sub> in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors;
- Fugitive CH<sub>4</sub> – CH<sub>4</sub> that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH<sub>4</sub> emissions. These emissions have been estimated for various aspects of the energy sector, and starting in 2011, producers are required under 40 CFR 98, to estimate and report their CH<sub>4</sub> emissions to the EPA; and
- Combustion of produced oil and gas – BLM expects future operations to produce marketable quantities of oil and gas. Combustion of the oil and gas would release CO<sub>2</sub> into the atmosphere. Fossil fuel combustion is the largest source of global CO<sub>2</sub>.

##### **5.1.4.1 Direct Emissions**

A number of existing authorized activities within the BLM Wyoming FOs generate GHG emissions. Oil and gas development activities can generate GHGs during the drilling, completion and production operations. Carbon dioxide emissions result from the use of combustion engines for off highway vehicles and other recreational activities. Wildland fires also are a source of CO<sub>2</sub> and other GHG emissions, and livestock grazing is a potential source of methane. Other activities with the potential to contribute to climate change include soil erosion from disturbed areas and fugitive dust from roads, which have the potential to darken snow-covered surfaces and cause faster snowmelt.

In order to determine the volume of emissions that authorized activities on public lands could emit, BLM Wyoming's air quality impact analysis in the RMP EISs began with the preparation of emissions inventories for all

existing sources in the planning area in accordance with existing guidance. These emissions inventories were compared to existing air quality data, Federal emission factors and other available information in order to determine the base year emissions, from all sources, at the time of analysis. For the oil and gas program, these emission inventories resulted in specific well emission factors. The emissions inventories, and the resultant emission factors, were then used to prepare an emissions estimate for the projected RFD (which included drilling, completing and placing the wells in production). BLM then calculated total oil-and gas-related annual emissions for the field office, for each year of the RMPs expected life, based on those expected emissions, and the expected well development RFD scenario (rate, density and type of wells, and where the greatest potential is in each field office). Peak emissions based on the maximum year of construction and the maximum year of production were then used to compare the alternatives under consideration in the EIS. Emissions were calculated using conservative assumptions about the likelihood of potential activities occurring under each alternative.

In the emission inventories, BLM quantified the direct emissions of the greenhouse gases CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O from new and existing sources in terms of CO<sub>2</sub>e. Estimates of emissions from oil and gas activities in the subject RMP EISs', including CO<sub>2</sub>e, assumed that all of the potential development identified in the RFD would occur.<sup>26</sup> The RMP EISs' used a 100-year GWP timeline to ensure that consistent comparisons could be made across Federal agency estimates and data.

Specific to oil and gas development, the RMP EISs quantified emissions from the following specific emissions-generating activities, by well type. All of these activities are included in BLM's estimates of direct CO<sub>2</sub>e emissions and are generally referred to as "operational" emissions in the RMP EIS'.

#### Leasable Fluid Minerals – Conventional Natural Gas Development

- Well pad and compressor station pad construction
- Road construction and maintenance
- Well drilling, completion, and testing
- Well completion flares
- Well workovers
- Construction vehicle exhaust and fugitive dust
- Maintenance vehicle exhaust and fugitive dust
- Commuting vehicle exhaust and fugitive dust
- Natural gas fired compressors
- Dehydrator, separator, and water tank heaters
- Dehydrator vents
- Tank venting, flashing, and load-out
- Wellhead equipment leaks
- Pneumatic pumps and devices
- Well pad and road reclamation
- Wind erosion

#### Leasable Fluid Minerals – Coalbed Natural Gas Development

- Well pad, compressor station pad, and water disposal well pad construction
- Road construction and maintenance
- Well drilling, completion, and testing
- Well workovers
- Construction vehicle exhaust and fugitive dust
- Maintenance vehicle exhaust and fugitive dust
- Commuting vehicle exhaust and fugitive dust
- Natural gas fired compressors
- Dehydrator and tank heaters
- Dehydrator vents

---

<sup>26</sup> This was a necessary assumption of the RMP EIS analysis in order to compare the maximum expected emission levels between alternatives, and the allowable levels of oil and gas development that would be allowed.

Wellhead equipment leaks  
Pneumatic pumps and devices  
Well pad and road reclamation  
Wind erosion  
Produced water evaporation ponds

Leasable Fluid Minerals – Oil Development

Well pad and compressor station pad construction  
Road construction and maintenance  
Well drilling, completion, and testing  
Well completion flares  
Well workovers  
Construction vehicle exhaust and fugitive dust  
Maintenance vehicle exhaust and fugitive dust  
Commuting vehicle exhaust and fugitive dust  
Natural gas fired compressors  
Dehydrator, separator, and water tank heaters  
Dehydrator vents  
Tank venting, flashing, and load-out  
Wellhead equipment leaks  
Pneumatic pumps and devices  
Well pad and road reclamation  
Wind erosion

In general, the estimated direct emissions in the RMP EISs were determined using the following assumptions:

- Activities would proceed in accordance with the projections in the RFDs, which are based upon known geologic conditions, current development technology, and industry-provided data about future planned development.<sup>27</sup>
- Appropriate Required Design Features and Best Management Practices will be applied as appropriate and consistent with regulatory authority.
- Operations would comply with Federal and state rules and regulations promulgated under the Clean Air Act.
- BLM may require project proponents to conduct pre-construction and/or project air monitoring to assist in environmental analysis.
- BLM will work cooperatively with Wyoming Department of Environmental Quality (WDEQ) to determine the best mechanism to submit, track, and approve project specific pre-construction monitoring or other monitoring data required by project approval decisions.
- BLM will work cooperatively with WDEQ to share data collected from the existing BLM-operated Wyoming Air Resource Monitoring System (WARMS) network and to support Wyoming DEQ's air monitoring network through siting, operation, and funding of additional monitoring sites.
- BLM will continue to fund and operate existing National Atmospheric Deposition Program (NADP) monitoring site in accordance with existing agreements.

While the above assumptions do not generally affect the total emissions that may result from the Proposed Action, they demonstrate that adequate regulatory mechanisms are in place to allow BLM to monitor development, and minimize future site-specific or cumulative impacts in Wyoming. The RFDs include assumptions about the pace and timing of mineral development activities, which depend on a variety of factors outside the control of the BLM, including national and international energy demand and prices, production factors within the planning area, and individual strategic choices made by operators. Additional discussion of uncertainty in the projected emission estimates is provided in Section 4.2.5.

---

<sup>27</sup> *Id* at 14

The administrative acts of offering parcels and issuing leases (or in this case, affirming the issuance of leases) have no direct impacts to air quality. Any potential effects to air quality would occur only if the leases are developed. The annual planning area direct CO<sub>2</sub>e emission levels presented below represent baseline emission levels from existing development plus new emissions from the projected RFDs, which include both non-Federal and Federal well projections. See Table 9 for the planning area total RFDs.

**Table 11: BLM Wyoming Total Annual Federal and Non-Federal Direct Oil and Gas CO<sub>2</sub>e**

Planning Area	Total Federal Mineral Acreage Available to Leasing	Total Annual : Direct Oil & Gas CO <sub>2</sub> e from full Federal and Non-Federal existing Oil & Gas plus all-lands RFD (mt/year)
LFO	2,640,000	1,502,877.0 <sup>28</sup>
BFO	3,300,000	684,908.4 <sup>29</sup>
BHB	2,500,000	233,096.0
ARMPA	22,100,000	3,291,209.0
TOTAL	30,540,000.0	5,712,090.4

In this EA, due to the statewide distribution of the leases analyzed under the Proposed Action, and the varying types, levels and potential for development across all lands in Wyoming, BLM Wyoming has calculated estimates of GHG emissions associated with the Proposed Action based on existing planning area RFD well total estimates and the projected RMP direct emissions estimates (CO<sub>2</sub>e) and expected annual production. BLM has prorated the expected emissions from the RFDs by the acreage of the Proposed Action leases. BLM Wyoming considered estimating emissions based on estimates of numbers of new wells that could potentially be installed on the Proposed Action lease parcels, but concluded that this approach would duplicate the analysis that was used to develop the RFDs. Moreover, in consideration of the variability in well types, depths, specific drilling technology, and the rate of well development in Wyoming (See Table 9), development of specific well-emission estimates for lease parcels is problematic because it would require untenable assumptions (e.g. different well types can't be "averaged" together). By contrast, the total emissions estimate for a planning area, which accounts for differences in emissions among well types expected across the planning area, can readily be averaged across the area and pro-rated to lease parcels. This step-down, planning-area-based analysis provides greater consistency and continuity with previous analyses and utilizes existing data, including the RFD reports prepared for the RMP EISs by BLM Wyoming's Reservoir Management Group (RMG), as previously described. These RFDs represent the best available data about the potential future oil and gas activity on BLM administered mineral estates in Wyoming.

Specifically, BLM Wyoming is utilizing the total annual CO<sub>2</sub>e estimates for each planning area (based on existing development and RFDs), divided by total Federal mineral estate open to leasing in the planning area. This calculation yields a conservative per-acre CO<sub>2</sub>e emission factor that can be used to calculate an estimate of total lease sale acreage direct CO<sub>2</sub>e (metric tons/year). This approach prorates total annual direct emissions across the proposed lease acreage by the total Federal mineral estate open to oil and gas leasing under the planning area RMP ROD. This approach therefore accounts for any type of well that may be drilled, as well as the increasing horizontal drilling activity that is occurring in the state, since these types of wells typically drill into and produce from multiple mineral estates.

The following table provides the per-acre direct CO<sub>2</sub>e emission factor applied to the Proposed Action lease acreage and the resultant total projected annual direct CO<sub>2</sub>e from the Proposed Action if developed consistent with the RMP RFD.

<sup>28</sup> Lander FEIS, pg 1785; Buffalo RMP FEIS, Table 4.24; Bighorn Basin RMP FEIS, Appendix U, Tables U-80, U-54 and U-27; ARMPA FEIS pg 4-11.

<sup>29</sup> See Cumulative Impacts, Section 4.17.3.3, for calculations of BFO's direct O&G CO<sub>2</sub>e emissions for a comparison of the 100-yr GWP to 20-year GWP values.

**Table 12: BLM Wyoming Planning Area Per-acre Direct CO<sub>2</sub>e and Projections for the Proposed Action**

Planning Area	Total FO Mineral Acreage Open to Leasing	Direct Oil & Gas CO <sub>2</sub> e from full Federal and Non-Federal Oil & Gas RFD (mt/year)	CO <sub>2</sub> e/ acre	Number of Parcels	Total acreage of the Parcels	Projected annual direct CO <sub>2</sub> e for 61 Parcels (mt/year)
LFO	2,640,000	1,502,877.0	0.57	0	0.00	0.00
BFO	3,300,000	684,908.0	0.21	1	1,396.61	289.90
BHB	2,500,000	233,096.0	0.09	1	426.16	39.70
ARMPA	22,100,000	3,291,209.0	0.15	59	54,703.70	8,146.70
<b>Totals</b>	<b>30,540,000.0</b>	<b>5,712,090.0</b>		<b>61</b>	<b>56,526.47</b>	<b>8,476.30</b>

- The projected direct emissions from development of the Proposed Action (8,476.30 mt/year) represent approximately 0.148% of the total BLM Wyoming planning documents projected annual direct CO<sub>2</sub>e (5,712,090.0 mt/year). According to EPA's GHG Equivalency Calculator, the emissions from the Proposed Action would equal 978 homes' energy use for one year, or 0.002 coal-fired power plants in one year, or 1,081,001,375 smartphones charged.
- As compared to the 2014 USGS estimate of 9,089,000 mt (9.089 MMT) of CO<sub>2</sub>e in 2014 for Wyoming, the Proposed Action represents 0.093%.
- According to EPA,<sup>30</sup> Wyoming's direct GHG emissions from the petroleum and natural gas system sector in 2018, was 6.5 MMT (6,500,000 mt) of CO<sub>2</sub>e. Since this number represents only those sources that are required to report under EPA regulations promulgated at 40 CFR Part 98, Mandatory Greenhouse Gas Reporting, this estimate only represents a subset of the fluid mineral fossil fuel industry and may not provide an accurate gauge of the contribution to annual direct CO<sub>2</sub>e from the Proposed Action. However it remains the best gauge nationally, and the Proposed Action would represent approximately 0.130% of the reported total.

The currently available information about GHGs and climate change does not permit an assessment of the relationship between specific project-scale GHG emissions and specific effects on climate change because climate change operates on a global scale. Assessing the impacts of GHG emissions on global climate change likewise requires modeling on a global scale, which would not be sensitive to the comparatively small contribution of emissions from the proposed action. Potential effects on climate change are influenced by GHG emission sources from around the globe, and current methodologies cannot distinguish global climate change impacts associated with GHG emissions originating from a discrete, and relatively small, area such as the project area. Global climate considerations are discussed in Section 5.1.8.3. Additional information regarding potential impacts of climate change are discussed in Section 4.9 of the Lander RMP FEIS, Section 3.9 of the Bighorn Basin RMP FEIS, Section 3.2.7 and page 4-57 of the ARMPA FEIS.

#### **5.1.4.2 Indirect Emissions**

The BLM RMG and BLM field and district office staff provided information on production of oil and gas to support analysis in the RMP EISs. For each planning unit (or field office within a planning unit), BLM developed total annual oil and gas production estimates for each EIS alternative. The information used to develop these estimates included the number of wells drilled annually in each field office or planning unit by alternative (from the RFD), the percent of oil wells versus gas wells, the percent of wells completed, production decline curves for oil and gas wells, and estimates of cross-production from both oil and gas wells.

<sup>30</sup> <https://ghgdata.epa.gov/ghgp/main.do> (accessed 3/22/19)

As discussed in Appendix N, Social and Economic Impact Analysis Methodology, from the ARMPA FEIS, the procedure to determine total Federal production was as follows: For each year, the estimated number of wells completed was broken down into oil or gas wells based on the breakdown assumptions for the field office and planning unit provided by BLM staff. For each well type, the average first year production rate (volume) from the annual decline curves for each field office and planning unit (as provided by RMG) was applied to determine the total production from first-year wells. For subsequent years, the appropriate average production rates from the decline curves were applied to the number of second year wells, third year wells, and so on. Total production was summed across all the well age cohorts for each year within the analysis period. Cross-production volume was calculated based on the numbers of wells of each type and the cross-production rates from the RMG, and added to the total production volume.

The number below reflects the estimated total production for each of the planning area's RMP RODs based on the selected alternatives RFD. The EPA GHG Equivalencies Calculator was then used to calculate the total CO<sub>2</sub>e, assuming 100% combustion of the produced oil and gas. For comparison purposes, one coal-fired power plant, in a single year, emits on average 70,700,000 mt CO<sub>2</sub>e.

**Table 13: BLM Wyoming Total Annual Indirect CO<sub>2</sub>e**

BLM Wyoming Federal Projected Indirect Annual CO <sub>2</sub> e (mt) for the year 2020						
Planning Unit	Gas (MCF)	Oil (BBLs)		Gas (mt CO <sub>2</sub> e)	Oil (mt CO <sub>2</sub> e)	Total Annual Indirect CO <sub>2</sub> e
ARMPA	993,733,861	12,012,924		54,742,811.0	5,165,557.3	59,908,368.3
Bighorn Basin	8,500,000	4,000,000		468,248.0	1,720,000.0	2,188,248.0
Lander	238,200,000	2,400,000		13,121,962.0	1,032,000.0	14,153,962.0
Buffalo	47,000,000	3,800,00		2,589,136.0	1,634,000.0	4,223,136.0

Emission Factor Source: EPA GHG Equivalencies Calculator  
<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>  
 CO<sub>2</sub> emissions generated from oil consumption: 0.43 metric tons CO<sub>2</sub>/barrel oil  
 \* MCF=one thousand cubic feet  
 \* BBLs=barrels

Similar to the calculations made for direct CO<sub>2</sub>e, the following table shows the per-acre indirect CO<sub>2</sub>e emission rate for the various planning areas, and the leases considered here. BLM used this methodology to calculate indirect emissions to account for the same variability in resource distribution and production methods described in the discussion of the direct emissions calculation methods.

**Table 14: BLM Wyoming Planning Area per-acre Annual Indirect CO<sub>2</sub>e and Projections for the Proposed Action**

Planning Area	Total BLM Wyoming Mineral Acreage Open to Lease	Total BLM Wyoming Indirect Federal O&G CO <sub>2</sub> e (mt/yr)*	Average Annual Indirect CO <sub>2</sub> e /acre	Number of Proposed Action Leases	Total acreage in the Proposed Action	Total Projected Federal Indirect CO <sub>2</sub> e (mt/yr) for the Proposed Action
Lander	2,640,000	14,153,962.0	5.36	0	0.00	0.00
Buffalo	3,300,000	4,223,136.0	1.28	1	1,396.61	1,787.30
Bighorn Basin	2,500,000	2,188,248.0	0.88	1	426.16	373.02
ARMPA	22,100,000	59,908,368.3	2.71	59	54,703.70	148,290.02
<b>*Year 2020</b>				<b>Total:</b>	<b>61</b>	<b>56,526.47</b>
						<b>150,450.33</b>

Accordingly, the per-acre indirect CO<sub>2</sub>e emission rate for the Proposed Action ranges from 0.88 mt/acre for lands in the Bighorn Basin to approximately 2.71 mt/acre in the ARMPA. BLM would expect the annual emission rate to average approximately 150,450.33 mt/year if all wells under the current RFDs were drilled and put on production, and if all subsequent production was combusted at some point in the future. The indirect emissions from the proposed action equate to a approximately 17,361 homes' energy use in one year, 0.039 coal fired power plants in one year, or 19,187,264,907 smart phones charged.

- The Proposed Action acreage represents approximately 0.187% of the annual total expected indirect CO<sub>2</sub>e emissions from Federal production (80,473,714.3 mt/year) in Wyoming, based on BLM planning estimates.
- According to WOGCC production data for 2018, the calculated total statewide emissions are 136,500,000.0 mt of CO<sub>2</sub>e; the annual indirect emissions from the Proposed Action, represent approximately 0.11%.
- Based on the USGS 2014 estimate of 75,180,000 mt (75.18 MMT) of indirect CO<sub>2</sub>e for Wyoming, the Proposed Action represents approximately 0.20%.

Likewise, the EPA GHG Inventory Report (ES-11) discloses that total oil and gas related combustion emissions in the U.S. in 2018, was 5,031,800,000 mt. Projected annual indirect CO<sub>2</sub>e from the Proposed Action would represent approximately 0.003%. A common well life assumption for analysis purposes in Wyoming planning documents is 40 years. Based on a 40 year well life assumption, the total projected indirect emissions from the Proposed Action would be 6,018,013.24 mt; this amount represents approximately 0.12% of EPA's 2018 annual U.S. oil and gas emission total.

Based on the USGS 2014 total gross CO<sub>2</sub>e emissions for BLM Wyoming Federal fossil fuel operations (727.7 MMT CO<sub>2</sub>e), the total gross (direct plus indirect) emissions from the Proposed Action represent approximately 0.022% of the total (158,926.59 mt / 727,700,00 mt). Similarly, the total gross emissions from the Proposed Action represent approximately 0.856% of the 2014 USGS estimate for nationwide Federal oil and gas related emissions (18,569,000 mt).

## 5.1.5 Uncertainty

### 5.1.5.1 Direct and Indirect Emission Estimate Uncertainties

The direct and indirect emission estimates above provide an estimate of the full potential for GHGs released into the atmosphere from initial wellsite construction, well drilling and completion, production, and end use. A rough estimate was possible using full field constrained potential well development estimates prepared for the ARMPA, Bighorn Basin and Lander RMP EISs.

Although this EA presents quantified estimates of potential direct and indirect GHG emissions associated with the potential for oil and gas development on the leases, GHG emission estimates involve significant uncertainty due to unknown factors including actual production, how produced substances are used, the form of regulation of GHG parameters by delegated agencies, and whether any Best Available Control Technologies are utilized at the upstream or downstream activity location(s). To illustrate the uncertainty regarding specific well estimates, economically viable vertical gas wells on 40 acre downhole spacing within the PFO can be drilled into a conventional reservoir at approximately 7,000 feet deep, but just 30 miles away, a tight sand reservoir is produced by directional wells, on 10-acre downhole spacing with wells that can be in excess of 14,000 feet deep. Similarly, a coalbed methane well in the RFO can be as deep as 4,000 feet; but just 1,000 feet deep in the BFO. Deeper wells in this example require engines with a greater horsepower, and take longer to drill but may produce for shorter or longer periods of time. The BTU content of the product can also vary substantially which will ultimately influence any estimates of GHGs produced or combusted, as can the total volume of liquids produced with the gas stream which also requires handling. As another example, horizontal wells in the RFO may be in the range of 6,000 feet deep, but a similar horizontal oil

well in the CFO may be 12,000 feet deep due to changing geologic conditions.<sup>31</sup> Within the RSFO, approximately 15% of the existing wells are less than 5,000 feet deep, 43% are between 5,000 – 10,000 feet deep, 40% are between 10,000 – 15,000 feet deep, and 1% are greater than 15,000 feet deep. These wells depths are associated with both gas and oil wells; approximately 34% were drilled directionally, 3% were drilled horizontally, and 39% were drilled vertically.

The vast majority of the horizontal play in Wyoming is still exploratory; as operators increase their reservoir and drilling knowledge, the time to drill, complete and put horizontal wells in production may decrease over time. Ultimately, while estimates in this EA are based on the best available data, including information from existing operators regarding future drilling plans and targets, these estimates are subject to many conditions that are largely beyond the BLM's control. Unforeseen changes in factors such as geologic conditions, drilling technology, economics, demand, and federal, state, and local laws and policies could result in different outcomes than those projected in the RFD and RMP EIS', and in this EA. The ultimate result in changing laws or policies cannot be predicted with any accuracy; resultantly, the RFD could not be realized if these policies restricted future oil and gas development.

To this extent, the RFD scenario reports prepared for the relevant RMPs disclose variable rates of success over time for wells drilled in these planning areas. Based on both historical and current information, the rate of production success for wells ranges from a low of 13% to nearly 90%, depending upon the location within the individual field offices, the geologic formations targeted, price indexes, and technological advances. As discussed in the RFD reports, success rates are expected to decline due to future exploration of unconventional resources: "From the early 1990's to present, activity has focused almost entirely on very low risk development drilling in and around known field areas, which helped to improve the overall success rate. More future exploratory drilling will be required to discover new resources in the Planning Area and to determine whether its potential coalbed natural gas resource is economic to produce. Since the risk of failure is higher for these types of activities, the success rates could decline slightly in the future." See RFO RFD (2004), pages 4 - 5, KFO RFD (2006), pages 4-7 to 4-19, and PFO RFD (2006), Table 5]. [See Bighorn Basin (2014), pages 24 - 27, and LFO RFD (2006), pages 12-15]. See BFO RFD (2012) pages 16-17, and CFO RFD (2005) pages 7-9. RFD well numbers for the RFO, KFO, PFO, CFO and NFO were updated under the ARMPA (2015).<sup>32</sup>

#### ***5.1.5.2 Oil and Gas Production and End Use Uncertainty***

The rough estimates of indirect CO<sub>2</sub>e emissions presented above are qualified by uncertainty in potential future production, and in predicting the end uses for the fuels extracted from a particular leasehold. Future production is uncertain with regard to the actual levels of development over time, levels of development over the life of the lease, new technology, geologic conditions, and the ultimate level of production from any given well (whether reservoir related, or for economic reasons). As noted in the foregoing explanations, BLM is using a per-acre average emission estimate; this approach may overestimate or underestimate emissions in areas where resource conditions depart from "average" but it allows the BLM to assume for analysis purposes that all lands have equal potential for production. While this may not hold true based on site-specific geology, it is a reasonable forecast that assumes all lands may be produced at some point in the future and accounts for the large spacing units associated with Wyoming's exploratory horizontal wells. After extraction from federal leases, end uses of oil and gas may include refining for transportation fuels, fuel oils for heating and electricity generation, or production of asphalt and road oil. Oil and gas may also be used in the chemical industry, for the manufacture of medicines and everyday household items, plastics, military defense and for the manufacture of synthetic materials. The BLM does not control the specific end use of the oil and gas produced from federal leases. As a result, the BLM can only provide an estimate

---

<sup>31</sup> Both horizontal well fields are targeting the Niobrara formation, but are found at different depths due to geologic processes.

<sup>32</sup> With a few exceptions, all of the aforementioned RFDs can be found on BLM's planning pages for the subject RMP. A separate RFD technical report was not prepared for the ARMPA, but the information from the base RMPs was updated to address any new constraints resulting from the analysis in the EIS' associated with the 2015 ROD. The NFO RFD is discussed within the RMP FEIS and can be provided upon request; and for the BFO, an updated RFD report is provided as Appendix G in the approved RMP and the original technical report can be provided upon request.

of potential GHG emissions by conservatively assuming that all produced oil and gas would eventually be combusted.

Fossil fuels can be consumed, but not combusted, when they are used directly as construction materials, chemical feedstocks, lubricants, solvents, waxes, and other products. Common examples include petroleum products used in plastics, natural gas used in fertilizers, and coal tars used in skin treatment products. According to information from the EIA,<sup>33</sup> in 2017 about 13% of total petroleum products consumed in the United States were for non-combustion use. Non-combustion use accounted for about 3% of the total amount for natural gas, while non-combustion use of coal was less than 1%. Information regarding non-combustion use of oil products was not provided.

### 5.1.6 Climate Change Impacts

The EPA identifies Wyoming as part of the Mountain West and Great Plains region. The following bullet points summarize potential changes that are expected to occur at the regional scale (<https://archive.epa.gov/epa/sites/production/files/2016-09/documents/climate-change-wy.pdf>).

- The region is expected to experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow would be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs would be drier.
- More frequent, more severe, and possibly longer-lasting droughts are expected to occur.
- Crop and livestock production patterns could shift northward; less soil moisture due to increased evaporation may increase irrigation needs. Drier conditions would reduce the range and health of ponderosa and lodge pole pine forests, and increase the susceptibility to fire. Grasslands and rangelands could expand into previously forested areas.
- Ecosystems would be stressed and wildlife such as the mountain lion, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

Other impacts could include:

- Increased particulate matter in the air as drier, less vegetated soils experience wind erosion.
- Shifts in vegetative communities which could threaten plant and wildlife species.
- Changes in the timing and quantity of snowmelt, which could affect both aquatic species and agricultural needs.
- Projected and documented broad-scale changes within ecosystems of the U.S. are summarized in the Climate Change Supplemental Information Report (2010). Some key aspects include:
  - Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (Climate Change SIR 2010). Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to 2 weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
  - Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff increase fire risks.
  - Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect populations such as pine beetles, which have killed trees on millions of acres in western U.S. and Canada. Warmer winters allow beetles to survive the cold season, which would normally limit populations; while

---

<sup>33</sup> <https://www.eia.gov/todayinenergy/detail.php?id=35672>

concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

The USGS, in cooperation with the BLM, produced a report entitled the Wyoming Basin Rapid Ecological Assessment,<sup>34</sup> which provides projections of future climatic changes over the majority of Wyoming, while cautioning that reasonably foreseeable changes in climate vary due to natural inter-annual and decadal variability, uncertainty about future greenhouse gas emissions, and the range of uncertainties in the existing global climate models. The report recognizes that climate models differ in how they represent climate processes such that the models will produce different climate projections for a given time period and location, even with the same future emissions scenario. Based on the analysis, the report's analysis generally agrees with the determination that global temperatures are expected to increase (IPCC, 2013) such that warmer temperatures in the future can be expected, although the magnitude and consequences of warming are uncertain, and summers are projected to warm more than winters (an increase of 4.5 °F versus 3.5 °F) (fig. 5.1 in Lukas et al., 2014). No statistically significant changes in precipitation are predicted in the Wyoming Basin, but winters may be wetter and summers likely drier. Despite the lack of statistically significant projected changes in precipitation, the results suggest that temperature increase alone could increase evaporation and plant water demand; thus, even without a decrease in precipitation, water availability for ecosystems could decrease if precipitation remains about average.

### **5.1.7 Mitigation of Impacts from GHG Emissions and Climate Change Impacts**

The BLM regulates portions of natural gas and petroleum systems identified in the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks report. In carrying out its responsibilities, BLM has developed BMPs designed to reduce emissions from field production and operations. Analysis and approval of future development on the lease parcels may include application of BMPs within BLM's authority, as Conditions of Approval (COAs), to reduce or mitigate GHG emissions. Additional measures developed at the project development stage also may be incorporated as applicant-committed measures by the project proponent, or added to necessary State of Wyoming air quality permits.

Mitigation measures to reduce the impacts of climate change and GHG emissions may include, but are not limited to:

- Flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion through the use of multi-chamber combustors;
- Water dirt roads during periods of high use in order to reduce fugitive dust emissions;
- Require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored;
- Installation of liquids gathering facilities or central production facilities to reduce the total number of sources and minimize truck traffic;
- Use of natural gas fired or electric drill rig engines;
- The use of selective catalytic reducers and low-sulfur fuel for diesel-fired drill rig engines; and,
- Adherence to BLM's Notice to Lessees (NTL)-4a concerning the venting and flaring of gas on Federal leases for natural gas emissions that cannot be economically recovered,
- Flaring of hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion;
- Protecting frac sand from wind erosion;
- Implementation of directional and horizontal drilling technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- Performing interim reclamation to reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads.

---

<sup>34</sup> <https://pubs.er.usgs.gov/publication/ofr20151155>

Additionally, the BLM encourages oil and gas natural gas companies to adopt proven cost-effective technologies and practices that improve operation efficiency and reduce natural gas emissions, to reduce the ultimate impact from the emissions.

In October 2012, the EPA promulgated air quality regulations for completion of hydraulically fractured gas wells. These rules require air pollution mitigation measures that reduce the emissions of VOCs during gas well completions. Mitigation includes a process known as “green completion” in which the recovered products are sent through a series of aboveground, closed, separators which negates the need for flowing back into surface pits as the product is immediately sent to gas lines and the fluids are transferred to onsite tanks. Green completions have been required by the Wyoming Department of Environmental Quality for many years in the Upper Green River Basin and the requirement was expanded throughout the State of Wyoming in 2015.

EPA Inventory data show that by adopting the BMPs proposed by the EPA Natural Gas Energy Star program, the industry has reduced emissions from oil and gas exploration and development: “During calendar year 2018, partners submitted an annual report detailing their efforts in 2017 to reduce methane emissions from their operations. These voluntary activities consisted of 45 technologies and practices and resulted in emissions reductions of 96.8 Bcf for the year. These methane emissions reductions have cross-cutting benefits on domestic energy supply, industrial efficiency, revenue generation, improved air quality, and greenhouse gas emissions reductions. The emission reductions are equivalent to additional revenue of approximately \$291 million in natural gas sales (assumes an average natural gas price of \$3.00 per thousand cubic feet).”

Specifically, EPA reports that 89% of the methane reductions came from the oil and gas production sector, by utilizing a variety of technologies including: reducing blow down frequency, installing vapor recovery units, and converting gas-driven pumps to electric, mechanical, or solar driven pumps. The BLM will continue to work with industry to promote the use of the relevant BMPs for operations proposed on Federal mineral leases where such mitigation is consistent with agency authorities and policies, and is supported by BLM’s NEPA analysis.

In addition to efforts to better respond and adapt to climate change, other Federal initiatives are also being implemented to mitigate climate change. The Carbon Storage Project was implemented to develop carbon sequestration methodologies for geological (i.e., underground) and biological (e.g., forests and rangelands) carbon storage. The project is a collaboration of Federal and nonfederal stakeholders to enhance carbon storage in geologic formations and in plants and soils in an environmentally responsible manner. The Carbon Footprint Project<sup>35</sup> is an effort to develop a unified GHG emission reduction program for the DOI, including setting a baseline and reduction goal for the Department’s GHG emissions and energy use.

#### ***5.1.8 Greenhouse Gas Emissions – Cumulative Impacts***

To the extent that economics, availability, and regulatory requirements encourage natural gas replacement of other existing fossil fuel use, global GHG emissions could be reduced by increased production of natural gas. For example, the EIA predicts that fuel switching will prompt an 83 percent increase in electric power sector natural gas consumption from 2009 to 2030 (EIA 2009).

While natural gas is likely to displace some fossil fuels, renewable energy is expected to replace some natural gas usage in a variety of applications, such as home heating and electric power generation. The EIA predicts that total natural gas consumption in the United States will fall by 14 percent from 2009 to 2030 (EIA 2009). If natural gas consumption decreases, natural gas production of Federal minerals in Wyoming may be less than the levels of development included in the RFD scenarios included in Table 9.

U.S. GHG emissions may not necessarily increase by the magnitude of potential GHG emissions from oil and gas production of Federal minerals in Wyoming. Oil and gas development may decline in other portions of the United States, thereby decreasing total U.S. GHG emissions from oil and gas production, even when new development in

---

<sup>35</sup> <https://www.carbonfootprint.com/carbonoffsetprojects.html> (accessed 04/05/2019)

these areas is added. If GHG emission reduction regulations applicable to oil and gas activities are implemented by U.S. EPA in the future, oil and gas development may preferentially increase in fields that produce these fuels with lower than average GHG emissions.

#### ***5.1.8.1 Cumulative Direct Emissions-Wyoming***

Using similar methodologies and the same RMP derived data, the BLM has calculated cumulative direct and indirect emission estimates for all existing and reasonably foreseeable Federal lease projects in Wyoming (BLM Wyoming considers all lease sales currently undergoing internal review to be reasonably foreseeable). The only difference is these are calculated using a statewide average per-acre emission factor to account for all Federal development and production actions that could be ongoing in the state. This average is a reasonable proxy for the multiple types of development that could occur on Federal lands in Wyoming.

The following table shows the total cumulative direct CO<sub>2</sub>e emissions from Federal lands in Wyoming. Similar methods to those used for the direct and indirect emissions calculations in this EA were used to calculate total direct CO<sub>2</sub>e, except BLM calculated an average statewide per-acre emission estimate. This emission estimate generalizes emissions across the state, but accurately accounts for the variable drilling rates and well types across the state, because it assumes that all Federal acreage has the same average potential to produce. In reality, resource conditions vary across the state, and changing future conditions may result in shifts in production expectations for different lands (such as the changes in expectations for CBNG, and the shift from gas development to oil development on other lands).

**Table 15: BLM Wyoming Cumulative Existing and Reasonably Foreseeable Direct Annual CO<sub>2</sub>e Emissions**

Planning Area	Total FO Mineral Acreage Open to Leasing	Total projected Direct Oil & Gas CO <sub>2</sub> e (mt/year) All Lands <sup>36</sup>	Direct CO <sub>2</sub> e/acre/year	End of Fiscal Year 2019 Total Existing Leased Acreage <sup>37</sup>	Total 3rd Quarter and 4th Quarter 2019 (193Q and 194Q) and 1st Quarter 2020 (201Q) Offered Lease Sale Acreage	2019 Statewide EA Reinstatement and 2019 Statewide EA Sold But Not Issued Acreage	Total 2nd and 3rd Quarter 2020 (202Q and 203Q) Analyzed Lease Sale Acreage	Proposed Action EA Acreage	Total Cumulative Existing and Proposed Lease Acreage
LFO	2,640,000	1,502,877.0	0.57						
BFO	3,300,000	684,908.0	0.21						
BHB	2,500,000	233,096.0	0.09						
ARMPA	22,100,000	3,291,209.0	0.15						
	<b>Total Federal Acreage Open to Oil and Gas</b>	<b>Total Annual Direct CO<sub>2</sub>e from all Federal and non-Federal Development</b>	<b>Statewide annual average per-acre Direct CO<sub>2</sub>e per-acre estimate:</b>						
	30,540,000	5,712,090	0.19	8,973,039.10	616,726.76	143,861.90	351,680.95	56,526.47	10,141,835.18
<b>Total Cumulative BLM Wyoming Direct Annual CO<sub>2</sub>e (mt/year) [Total Cumulative acreage* 0.19 mt/ac]</b>									<b>1,896,891.79 mt/yr</b>

<sup>36</sup> The Total projected direct oil and gas CO<sub>2</sub>e emission estimates, includes all RFD related emissions which would include Federal mineral estate actions in the Pinedale Anticline, Atlantic Rim, Continental Divide, and Jonah, for example. It also includes the emissions from the non-Federal RFD shown in Table 9.

<sup>37</sup> This acreage represents all acreage that is currently under lease, and therefore accounts for future development on leases that are not currently developed, and those with project areas currently under review (or recently completed), including Converse County, NPL, and Moneta Divide.

From information in Table 15, total existing cumulative projected statewide annual direct CO<sub>2</sub>e, represents approximately 33.21% of the total cumulative BLM Wyoming planning projections (1,896,891.79/5,712,090 mt/yr). Based on BLM public land statistics, the fact that only 50% of BLM existing leases are in producing status, BLM expects that only about 50% of these Federal Wyoming emissions are expected to occur (948,445,90 mt).

Likewise, as shown in Table 16 below, the reasonably foreseeable projects (2019 3Q, 2019 4Q, 2019 Statewide Reinstatement EA, 2019 Statewide Sold But Not Issued EA, 2020 2Q, 2020 3Q and the Proposed Action acreage), using the statewide per-acre average, would add approximately 218,607.35 mt/yr to the total existing average annual direct emissions (1,896,891.79 – 218,607.35 = 1,678,284.44 mt/yr), or 13.0% of the existing total direct CO<sub>2</sub>e. The direct emissions expected from the Proposed Action (Table 12) represent 0.51% of the existing total direct CO<sub>2</sub>e (8,476.26/1,678,284.44 mt).

**Table 16: BLM Wyoming Cumulative Reasonably Foreseeable Direct Annual CO<sub>2</sub>e Emissions**

Statewide annual average per-acre Direct CO <sub>2</sub> per-acre estimate:		Total 3rd Quarter and 4th Quarter 2019 (193Q and 194Q) and 1st Quarter 2020 (201Q) Offered Lease Sale Acreage	2019 Statewide EA Reinstatement and 2019 Statewide EA Sold But Not Issued Acreage	Total 2nd and 3rd Quarter 2020 (202Q and 203Q) Analyzed Lease Sale Acreage	Proposed Action EA Acreage	Total Direct CO <sub>2</sub> e from Reasonably Foreseeable Lease Actions
		616,726.76	143,861.90	351,680.95	56,526.47	
0.19	Total Annual Direct CO <sub>2</sub> e	115,350.32	26,907.40	65,777.12	10,572.50	218,607.35

#### *Regional Direct Emission Estimates*

In order to determine the existing annual direct CO<sub>2</sub> emissions from the Rocky Mountain and Northern Great Plains Regions for comparison purposes, we first divided each state's 2014 emission estimates from the USGS SIR by their respective 2014 total Federal producing acreage; this calculation resulted in a 2014 per-acre direct CO<sub>2</sub>e emission factor by state. The resulting 2014 per-acre emission estimate was then used to calculate total existing CO<sub>2</sub>e emissions for the years 2015-2018 using BLM information on annual producing acreage for each state. The 2015-2018 total calculated emissions for each state were then added to the 2014 USGS estimate to get total existing emissions through 2018. Since we want to compare emission levels expected on an annual basis, the five year total was then divided by 5 years to get an estimated annual average. Each region's annual average was summed and divided by the total number of states in each region (i.e. for Rocky Mountain it was divided by 5 states since Arizona is 0, and for the Northern Great Plains Region, it was divided by 3). These annual averages are referred to as a 5-year average annual total. Please refer to the full USGS SIR for specific information that the USGS incorporated into its analysis. For comparison purposes, it is the best available information at this time. This analysis is shown in the following table:

**Table 17: Regional Total Federal Direct CO<sub>2</sub>e (Excluding Wyoming)**

EIA REGION	Geographic State	Total 2014 O&G extraction (Direct) CO <sub>2</sub> e (MMT)	Total 2014 O&G extraction (Direct) CO <sub>2</sub> e (mt)	2014 Total Federal Producing Acreage	2014 Total Federal O&G Direct CO <sub>2</sub> e (mt/acre)	Calculated Total 2015-2018 Federal Direct CO <sub>2</sub> e (mt)	Calculated Total 2014-2018 Federal Direct CO <sub>2</sub> e (mt)
ROCKY	Arizona	0	0	0	0.00	0.0	0.0
	Colorado	2.6763	2,676,300	1,478,105	1.81	10,907,113	13,583,413
	Idaho	0	0	0	0.0	143,103.8	143,103.8

	Nevada	0.009322	9,322	22,077	0.42	43,101.6	52,423.6
	New Mexico	11.77	11,770,000	3,727,864	3.16	47,605,601.8	59,375,601.8
	Utah	2.493	2,493,000	1,119,366	2.23	10,049,364	12,542,364
NORTHERN	Montana	0.8332	833,200	766,544	1.09	3,127,478.0	3,960,678.0
	North Dakota	0.2002	200,200	570,645	0.35	836,540.3	1,036,740.3
	South Dakota	0.01781	17,810	44,589	0.40	75,049.7	92,859.7
					Average per-acre direct CO <sub>2</sub> e emission factor: 2.33	Total 2015-2018: 72,787,352.2	Total 2014-2018: 90,787,184.2

Similarly, based on the information in Table 17, the Federal direct CO<sub>2</sub>e 5-year annual average for each of the aforementioned states is shown in Table 18 below:

**Table 18: Regional Average Annual Federal Direct CO<sub>2</sub>e (excluding Wyoming)**

EIA REGION	Geographic State	Federal 5-year Average Annual Direct CO <sub>2</sub> e (mt)
ROCKY MOUNTAIN	Arizona	0.00
	Colorado	2,716,682.60
	Idaho	28,620.76
	Nevada	10,484.72
	New Mexico	11,875,120.36
	Utah	2,508,472.80
NORTHERN GREAT PLAINS	Montana	792,135.60
	North Dakota	207,348.06
	South Dakota	18,571.94

Thus, the Federal 5-year annual average direct CO<sub>2</sub>e emissions in the Rocky Mountain Region is 17,139,381.24 mt/yr and 1,018,055.60 mt/yr in the Northern Great Plains Region. Across both regions, the Federal 5-year average annual direct CO<sub>2</sub>e emissions is 18,157,436.84 mt/yr.

- Compared to the existing direct emissions from oil and gas development in the Rocky Mountain Region (excluding Wyoming), the projected annual direct CO<sub>2</sub>e from the Proposed Action (Table 12) is approximately 0.49% of the total. Based on the 5-year average for both the Rocky Mountain and Northern Great Plains Regions, not including Wyoming, the Proposed Action equates to approximately 0.47% of the annual total.
- Wyoming's estimated total direct emissions, at the end of fiscal year 2019, based on existing leased Federal estate was approximately 1,678,284.44 mt. If the total oil and gas related direct emissions at the end of 2018 in the combined Rocky Mountain and Northern Great Plains Regions was 90,787,184.2 (Table 17), Wyoming's oil and gas related direct emissions represents 1.85% of the total.

Average leasing activity in these states from 2008-2018<sup>38</sup> is provided in the following table:

**Table 19: Regional Average Number of Leases Issued Per Year**

State	Average number of leases	State	Average number
-------	--------------------------	-------	----------------

<sup>38</sup> *Id.* at 11

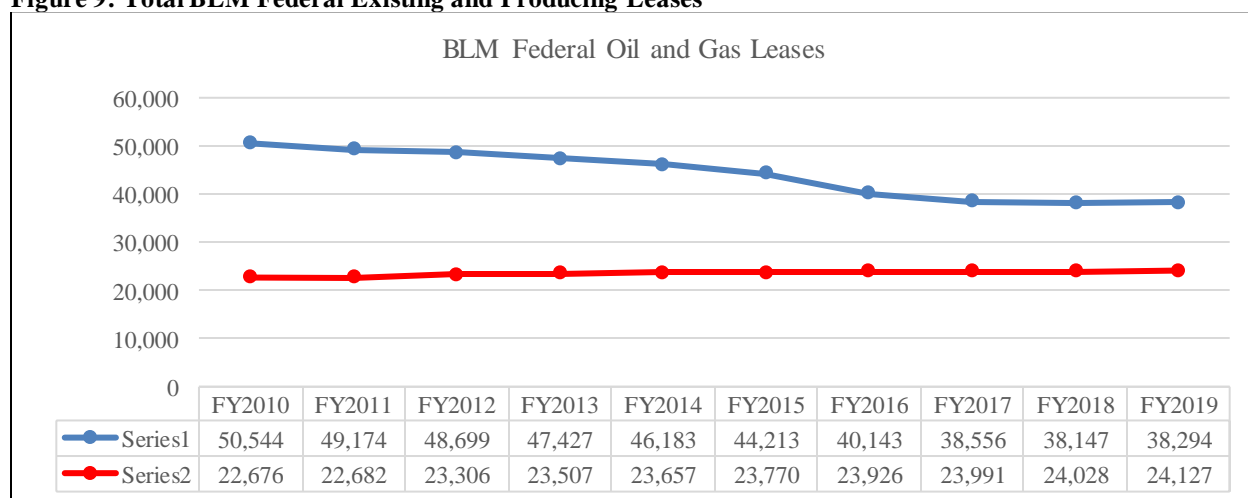
	issued per year		of leases issued per year
Arizona	1	New Mexico	84
Colorado	105	North Dakota	56
Idaho	1	South Dakota	33
Montana	120	Utah	92
Nevada	140	Wyoming	504

As mentioned above, the BLM is required to have quarterly lease sales in states where eligible lands are available for lease. Based on average lease sale numbers, annual average contributions to total emissions are expected to remain constant, or decrease if projections made by the EIA regarding future activity remains true (e.g., the expectation that natural gas usage will continue to grow but may be offset as additional renewable resources come online and coal use declines). Since BLM's consideration of lands for leasing is largely externally driven, it is impossible to project future leasing activity with a greater certainty than these general trends.

#### *National Direct Emission Estimates*

Nationally, the BLM had 38,294 leases in effect in 2019, and of these, 24,127 were in producing status (63%) according to BLM summary statistics.<sup>39</sup> These 38,294 leases contained approximately 26,397,326 acres. Trends in BLM national leasing activity over the last ten years is shown in the following figure:

**Figure 9: Total BLM Federal Existing and Producing Leases**



According to EPA, total 2017 U.S. GHG emissions (direct) from reporting oil and gas systems was 94 MMT (94,000,000 mt) CO<sub>2</sub>e<sup>40</sup>. Wyoming's cumulative direct CO<sub>2</sub>e emission estimate of 1,896,891.79 mt/yr, is approximately 2.02% of the national 2017 total.

#### **5.1.8.2 Cumulative Indirect Emissions- Wyoming**

BLM's analysis to determine the cumulative indirect emissions based on an average annual per-acre emission factor for Federal lands in Wyoming is similar to the method used for cumulative direct emissions. This data analysis is shown in the following table:

<sup>39</sup> <https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/oil-and-gas-statistics>

<sup>40</sup> <https://ghgdata.epa.gov/ghgp/main.do#>

**Table 20: BLM Wyoming Cumulative Existing and Reasonably Foreseeable Indirect Annual CO<sub>2</sub>e Emissions**

Planning Area	RFD Federal Mineral Estate Open to Leasing (wells)	RFD Federal and Nonfederal Lands (wells)	Total FO Federal Mineral Acreage Open to Leasing	Total Projected Indirect FEDERAL Oil and Gas CO <sub>2</sub> e (mt/year) <sup>41</sup>	Indirect annual CO <sub>2</sub> e/ acre/year	End of Fiscal Year 2019 Total Existing Federal Leased acreage	Total 3rd Quarter and 4th Quarter 2019 (193Q and 194Q) and 1st Quarter 2020 (201Q) Offered Lease Sale Acreage	2019 Statewide EA Reinstatement and 2019 Statewide EA Sold But Not Issued Acreage	Total 2nd and 3rd Quarter 2020 (202Q and 203Q) Analyzed Lease Sale Acreage	Proposed Action EA Acreage	Total Cumulative Existing and Proposed Lease acreage
LFO	1,695	4,254	2,640,000	14,153,962.0	5.36						
BFO	4,767	11,018	3,300,000	4,223,136.0	1.28						
BHB	1,141	6,054	2,500,000	2,188,248.0	0.88						
ARMPA	12,355	14,818	22,100,000	59,908,368.3	2.71						
<b>Statewide Totals:</b>	<b>19,958</b>	<b>36,144</b>	<b>30,540,000</b>	<b>80,473,714.3</b>	<b>Statewide average CO<sub>2</sub>e/ac/ year 2.64</b>	8,973,039.10	616,726.76	143,861.90	351,680.95	56,526.47	10,141,835.18
<b>Total Cumulative BLM Wyoming Indirect annual CO<sub>2</sub>e (mt/year) [Total Cumulative acreage * 2.64 mt/ac] =</b>										<b>26,724,006.12 mt/yr</b>	

<sup>41</sup> Projected production year 2020: includes existing production plus full RFD production estimate and includes development projects currently under consideration in Wyoming (e.g. Converse County, Moneta Divide, and NPL).

Based on estimates from BLM Wyoming's planning documents, calculated total existing Federal indirect CO<sub>2</sub>e is approximately 23,644,197.28 mt/yr based on the statewide average per-acre estimate of 2.64 CO<sub>2</sub>e /acre. Total existing plus reasonably foreseeable Federal lease actions is projected to result in 26,724,006.12 mt/yr as shown in Table 20.

Total new annual indirect CO<sub>2</sub>e from the reasonably foreseeable actions (2019 3Q, 2019 4Q, 2019 Statewide Reinstatement EA, 2019 Statewide Sold But Not Issued EA, 2020 1Q, 2020 2Q, 2020 3Q and the Proposed Action acreage containing approximately 1,168,796.08 acres) would add approximately 3,079,808.84 mt/yr to existing levels which represents approximately 13.03% of the existing annual emissions (23,644,197.28 mt/yr).

As shown in Table 20, of the total indirect CO<sub>2</sub>e projected under BLM's planning documents, the combined existing and reasonably foreseeable cumulative indirect emissions represent 33.21% of the total potential emissions (26,724,006.12/80,473,714.3 mt/yr). As only approximately 50% of the existing leases at the end of fiscal year 2018 were in producing status, 13,362,003.06 mt/yr would be expected from the combined production of existing and reasonably foreseeable leases.

Of the total indirect CO<sub>2</sub>e projected under BLM Wyoming's planning documents, the contribution from the Proposed Action (Table 20) represents approximately 0.19% (148,948.76/80,473,714.3 mt/yr).

#### *Regional Indirect Consumption Estimates*

BLM calculated regional indirect CO<sub>2</sub>e emission estimates using the same methodology as for regional direct emission estimates. However, the USGS data includes more combustion sources than just lease-generated production information (for example, information for refineries, which aggregate fluids from multiple sources) and we refer the reader to the full report for specific information that the USGS incorporated into its analysis. For comparison purposes, it is the best available information at this time. This data analysis, and the resulting average annual emissions estimates, are shown in the following table:

**Table 21: Total Regional Federal Indirect Emissions (excluding Wyoming)**

EIA REGION	Geographic State	Total 2014 Federal Oil & Gas combustion (Stationary sources) (MMT)	Total 2014 Federal Oil & Gas combustion (Stationary sources) (mt)	2014 Total Federal Producing Acreage	2014 Total Federal Oil & Gas Indirect CO <sub>2</sub> e (mt/acre/year)	2015-2018 Total Federal Indirect CO <sub>2</sub> e (mt)	Total 2014-2018 Federal Indirect CO <sub>2</sub> e (mt)
ROCKY MOUNTAIN	Arizona	0	0	0	0.00	0.0	0.0
	Colorado	1.31	1,310,000	1,478,105	0.89	5,338,832.6	6,648,832.6
	Idaho	0	0	0	20.45	143,103.8	143,103.8
	Nevada	0.018227	18,227	22,077	0.83	84,275.2	102,502.2
	New Mexico	40.314	40,314,000	3,727,864	10.81	163,056,264.5	203,370,264.5
	Utah	14.8	14,800,000	23,599,093	4.20	18,949,030.9	33,749,030.9
NORTHERN GREAT PLAINS	Montana	0.911319	911,319	766,544	1.19	3,420,703.5	4,332,022.5
	North Dakota	2.12474	2,124,740	570,645	3.72	8,878,274.5	11,003,014.5
	South Dakota	0.0156382	156,382	44,589	3.51	658,979.2	815,361.2
					Average per-acre Indirect CO <sub>2</sub> e emission factor: 5.07	Total 2015-2018: 200,529,464.2	Total 2014-2018: 260,164,132.2

Based on the information in the above table, the 5-year annual average for each of the aforementioned states is shown in Table 22:

**Table 22: Regional Average Annual Indirect CO<sub>2</sub>e (excluding Wyoming)**

EIA REGION	Geographic State	Federal 5-year Average Annual Indirect CO <sub>2</sub> e (mt)
ROCKY MOUNTAIN	Arizona	0
	Colorado	1,329,766.5
	Idaho	28,620.8
	Nevada	20,500.4
	New Mexico	40,674,052.9
	Utah	6,749,806.2
NORTHERN GREAT PLAINS	Montana	866,404.5
	North Dakota	2,200,602.9
	South Dakota	163,072.2

Resultantly, the total 5-year annual average indirect CO<sub>2</sub>e emissions in the Rocky Mountain Region is 48,802,746.80 mt/yr and 3,230,079.64 mt/yr in the Northern Great Plains Region. Across both regions, the 5-year average annual indirect CO<sub>2</sub>e emissions are 52,032,826.44 mt/yr.

- Compared to the existing indirect annual emissions from oil and gas development in the Rocky Mountain Region (excluding Wyoming), the projected annual indirect CO<sub>2</sub>e from the Proposed Action (Table 20) is approximately 0.31% of those states listed above. Based on the total 5-year average for both the Rocky Mountain and Northern Great Plains Regions, emissions from the Proposed Action equate to approximately 0.29% of the average annual total.
- At the end of 2019, Wyoming's estimated total existing indirect emissions (Table 20) was approximately 23,644,197.28 mt. If the total oil and gas related indirect emissions at the of 2018 in the combined Rocky Mountain and Northern Great Plains Regions was 52,032,826.44 mt/yr (Table 21), Wyoming's oil and gas related indirect emissions represents 45.44%.
- The projected cumulative increase in annual indirect CO<sub>2</sub>e emissions from reasonably foreseeable lease actions (2019 3Q, 2019 4Q, 2019 Statewide Reinstatement EA, 2019 Statewide Sold But Not Issued EA, 2020 1Q, 2020 2Q, 2020 3Q and the Proposed Action), utilizing the statewide per-acre average identified in Table 20, would represent an increase of approximately 6.3% of the Rocky Mountain Region's annual average indirect total (48,802,746.80 mt/yr), and 5.91% of the combined Rocky Mountain/Northern Great Plains annual average indirect total (52,032,826.44 mt/yr).

#### *National Indirect Consumption Estimates*

According to EPA's Inventory Report 1990-2018, total 2018 U.S. indirect GHG emissions from reporting combustion-related sources, was 5,031,800,000 mt CO<sub>2</sub>e. Wyoming's projected cumulative indirect emissions estimate of 26,724,006.12 mt/yr (Table 20) represent 0.53% of EPA's total national oil and gas related combustion estimate.

Acreage associated with the Proposed Action (Table 20) represents approximately 0.00299% of the EPA 2018 U.S. total indirect annual GHG emission estimate.

#### *Total Wyoming Direct and Indirect Emissions*

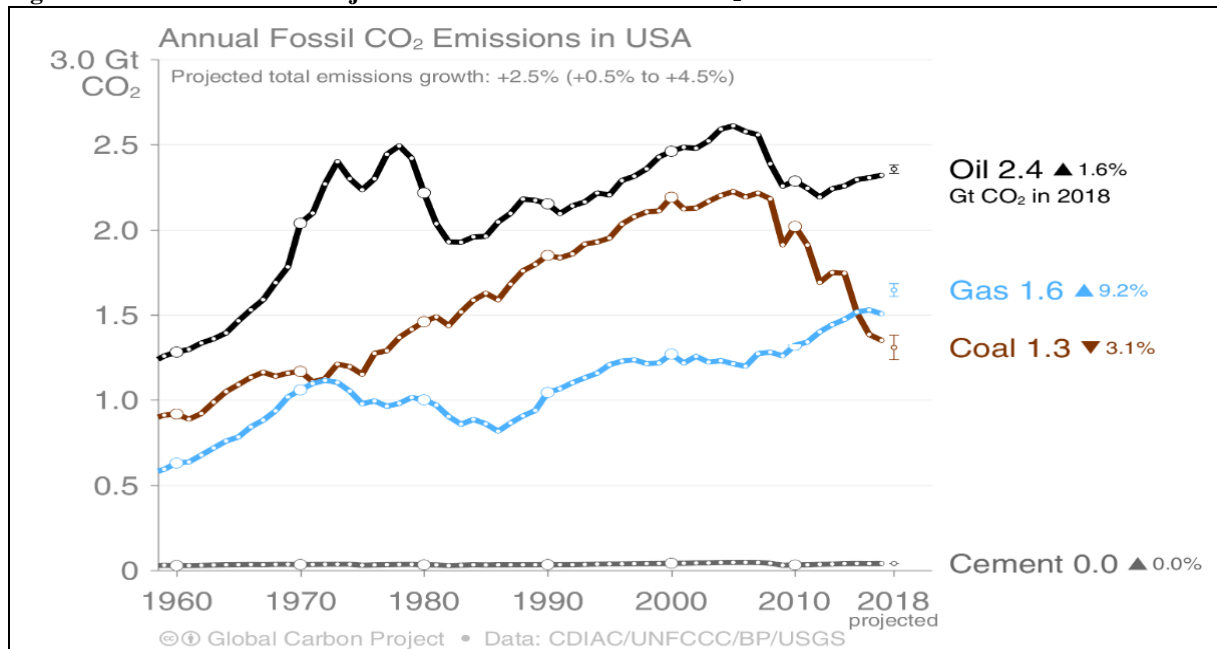
The cumulative gross total of BLM Wyoming's emissions (direct CO<sub>2</sub>e plus indirect CO<sub>2</sub>e) from Tables 15 and 20, is approximately 28,620,897.91 mt/yr. As compared to the total emissions estimate of 136,500,000 mt CO<sub>2</sub>e in

Wyoming for 2018, derived from the 2018 WOGCC production numbers, the Federal portion of Wyoming's estimated 2018 total is 20.97%.

According to EPA's Inventory Report 1990-2018, the total gross GHG emissions in the U.S. in 2018 was 6,686.7 MMT CO<sub>2</sub>e; Wyoming's contribution, based on the BLM Wyoming's gross cumulative emission estimate, is approximately 0.43%.

Compared to the Global Carbon Project's projected U.S. 2019 total of 4.1 Gt<sup>42</sup> for both oil and gas, the total Wyoming Federal cumulative emission estimate represents approximately 0.70%.

**Figure 10: Global Carbon Project- Total Annual Fossil Fuel CO<sub>2</sub> Emissions In the United States**



This EA, along with the analyses in RMP EISs for the Lander RMP, Bighorn Basin RMP, Buffalo RMP and ARMPA (2015), qualitatively describes impacts from climate that could be associated with potential development of the federal mineral estate from the actions analyzed. Included within the subject RMP EISs<sup>43</sup> are regional economic analyses. Terms such as “benefits” and “costs” can have different and very specific definitions within a discipline, such as economics, which can differ from their meaning in an “ordinary language sense.” While the RMP-EIS analyses use terms such as “benefits,” the analyses conducted in the RMP-EISs are regional economic impact analyses that discuss the effects of management actions on local/regional economic activity (often expressed in terms of employment, income, and output), and these effects are not the same as “economic benefits” in the context of an economic cost-benefit analysis. The distinction is more than semantic because principles of cost-benefit analysis do not allow comparison of economic impacts with economic costs and benefits as part of the net benefit calculation.

“Social cost of carbon” estimates are one approach that an agency can take to examine climate consequences from greenhouse gas emissions resulting from a proposed action. However, this EA provides no quantitative monetary estimates of any benefits or costs. NEPA does not require an economic cost-benefit analysis (40 C.F.R. § 1502.23),

<sup>42</sup> 4.0 Gt equal 4,000,000,000 mt (1,000,000,000 metric tons = 1 metric gigaton)

<sup>43</sup> Please refer to the applicable RMP FEISs for additional discussion of socioeconomic conditions within the project area. Specific information can be found at: GR RMP FEIS pgs 330-331, 336-337, 439, 441, KFO RMP FEIS pgs. 3-166 and 3-178, PFO RMP FEIS pgs. 3-80- 3-81, RFO RMP FEIS pgs. 3-74 - 3-77, LFO RMP FEIS pgs. 246-247 and 576-577, BFO RMP FEIS pgs. 614-615 and 631-632, BHB RMP FEIS pgs. 3-251 - 3-252 and 3-281 - 3-283, NFO RMP FEIS pgs. 103, CFO RMP FEIS pgs. 3-128, 3-135 - 3-136; ARMPA 4-177 - 4-187.

although NEPA does require consideration of “effects” that include “economic” and “social” effects (40 C.F.R. 1508.8(b)). Quantifying only the costs of oil and gas development by using the social cost of carbon metrics but not the benefits (as measured by the economic value of the proposed oil and gas development and production generally equaling the price of oil and gas minus the cost of producing, processing, and transporting the minerals) would yield information that is both inaccurate and not useful for the decision-maker, especially given that there are no current criteria or thresholds that determine a level of significance for social cost of carbon monetary values.

Instead, BLM’s approach to GHG and climate change impacts analysis in this EA includes calculations to show estimated direct and indirect GHG emissions from potential future development of the 61 parcels, and from oil and gas activities in Wyoming and the region. BLM also includes a qualitative discussion of potential climate impacts at global and regional scales. BLM’s approach recognizes that there are adverse environmental impacts related to climate change associated with the development and use of fossil fuels, provides potential GHG emission estimates, and discusses potential climate change impacts qualitatively. This effectively informs the decision-maker and the public of the potential for GHG emissions and the potential implications of climate change. This approach presents the data and information in a manner that follows many of the guidelines for effective climate change communication developed by the National Academy of Sciences (National Research Council 2010) by making the information more readily understood and relatable to the decision-maker and the general public.

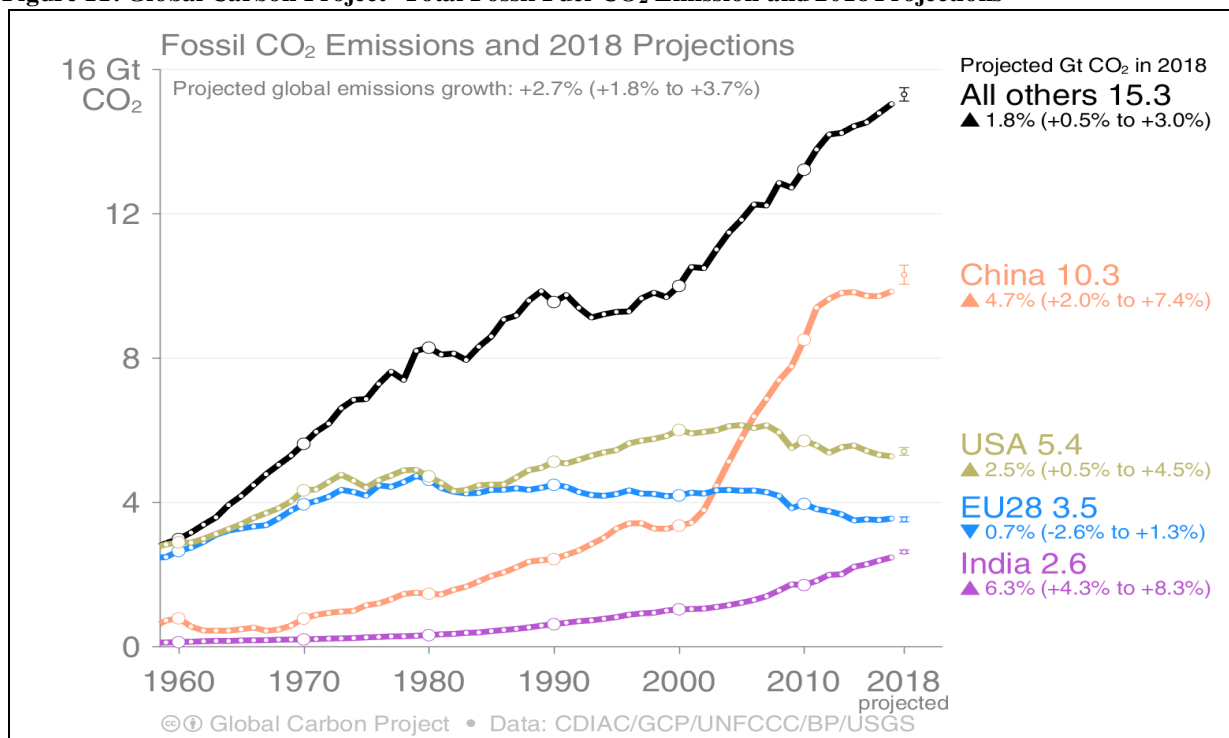
The Fourth National Climate Assessment (Chapter 22) projects that for the Northern Great Plains Region, which includes Wyoming, Montana, North Dakota, South Dakota, and Nebraska, predicts that conditions will become consistently warmer over the next two to three decades and will coincide with less snowpack and high variability in annual water availability with an overall small projected decrease in average streamflow. These climatic changes are projected to include an increase in the number of heavy precipitation events excluding the mountain ranges located in southern Wyoming.

Assuming that all conditions hold constant and emissions continue to increase unabated, the contributions to regional emissions from BLM Wyoming oil and gas development could contribute to these modelled projections of impact. However, this is unlikely, based on the information presented in Section 3.5 and the changing national, regional and global emissions over time, and the EIA projections regarding the future energy outlook.

### **5.1.8.3 National and Global Considerations**

The EPA’s [Inventory of U.S. Greenhouse Gas Emissions and Sinks](#) and estimates of U.S. emissions from the [Global Carbon Project](#) show that on average, the U.S. accounts for 14.2% of the global fossil fuel CO<sub>2</sub> emissions on an annual basis (since 2015). According to the EIA, domestic energy production accounts for about 90% of all U.S. energy consumption. The three major fossil fuels— petroleum (28%), natural gas (31.8%), and coal (17.8%) — combined accounted for about 77.6% of this production, while renewable energy sources (12.7%) and nuclear electric power (9.6%) provide the remainder. The EIA’s [Annual Energy Outlook](#) (AEO) report provides modeled projections of domestic energy markets through 2050, and includes cases with different assumptions regarding macroeconomic growth, world oil prices, technological progress, and energy policies. In general, the last few years of baseline reference case data has shown strong domestic production coupled with relatively flat energy demand. The reference case estimates that natural gas consumption will grow the most on an absolute basis (0.8% annually), and nonhydroelectric renewables will grow the most on a percentage basis. Petroleum and coal annual growth is projected to be negative over the projection period, at -0.3% and -0.2% respectively. The outlook suggests that the U.S. could become a net energy exporter over the projection period in most cases.

**Figure 11: Global Carbon Project- Total Fossil Fuel CO<sub>2</sub> Emission and 2018 Projections**



According to EIA, anticipated growth in domestic energy demand “is likely to contribute to budget pressure even as growth in the renewable energy sector is forecast to continue at the fastest rate on a percentage basis (3.1%). It is unclear how or if public policy advancements, technological advancements, free energy market shifts, governmental energy investments and tax strategies (credits), and global collaboration on these issues will take shape to provide for the changes necessary to transform the make-up of our modern infrastructure to one with a lower carbon state. The tight timeline of the carbon budget makes interim overshoot likely, as well as the need to deploy carbon dioxide removal measures at scale in the future to correct for any overshoot if the global consensus still centers on maintaining warming to 1.5°C above pre-industrial levels.” Implementing these types of measures and policy changes are beyond BLM's decision authority.

In trying to model climate changes under varying scenarios involving emission levels, the Fourth National Climate Assessment concludes: “Ultimately, however, the magnitude of human-induced climate change depends less on the year-to-year emissions than it does on the net amount of carbon, or cumulative carbon, emitted into the atmosphere. The lower the atmospheric concentrations of CO<sub>2</sub>, the greater the chance that eventual global temperature change will not reach the high end temperature projections, or possibly remain below 3.6°F (2°C) relative to preindustrial levels.” It goes on to state that: “The timing and magnitude of projected future climate change is uncertain due to the ambiguity introduced by human choices (as discussed in Section 4.2), natural variability, and scientific uncertainty,<sup>1</sup> which includes uncertainty in both scientific modeling and climate sensitivity.” (Footnotes omitted). Under various modelled scenarios where concentrations [of CO<sub>2</sub>] would exceed 400 ppm sustained over long periods of time (tens of thousands of years), some of the projected changes could include increases in temperature in the range of 9°-14°F (5°-8°C) and conditions analogous to the Eocene, a time in which there were no permanent land-based ice sheets.

The assessment also found, however, that “Net cumulative CO<sub>2</sub> emissions in the industrial era will largely determine long-term, global mean temperature change. A robust feature of model climate change simulations is a nearly linear relationship between cumulative CO<sub>2</sub> emissions and global mean temperature increases, irrespective of the details and exact timing of the emissions pathway . . . Limiting and stabilizing warming to any level implies that there is a

physical upper limit to the cumulative amount of CO<sub>2</sub> that can be added to the atmosphere. □ Eventually stabilizing the global temperature requires CO<sub>2</sub> emissions to approach zero. □ Thus, for a 3.6°F (2°C) or any desired global mean warming goal, an estimated range of cumulative CO<sub>2</sub> emissions from the current period onward can be calculated. The key sources of uncertainty for any compatible, forward looking CO<sub>2</sub> budget associated with a given future warming objective include the climate sensitivity, the response of the carbon cycle including feedbacks (for example, the release of GHGs from permafrost thaw), the amount of past CO<sub>2</sub> emissions, and the influence of past and future non-CO<sub>2</sub> species.”

There are currently no established significance thresholds for GHG emissions that BLM can reference in NEPA analyses, but all GHG emissions contribute incrementally to potential changes in global climate, through direct and indirect feedback loops, either directly or indirectly, and in the short-term or long-term. Cumulative effects (such as climate change) are only considered in the determination of NEPA significance when such effects can be prevented or modified by the agency’s decision-making (see [BLM NEPA Handbook](#), pg.72). While GHG emissions resulting from individual decisions can certainly be modified or potentially prevented by analyzing and selecting reasonable alternatives that appropriately respond to the action’s purpose and need, BLM has limited decision authority to meaningfully or measurably prevent the cumulative climate change impacts that result from global emissions.

Further, the degree to which GHG emissions from the proposed action (alone, and in combination with emissions from other activities) may contribute to changes in the absolute concentration of CO<sub>2</sub> in the global atmosphere is unknown – as is the significance of that contribution – because no tools presently exist to measure that relationship. Despite the uncertainty about the ultimate production of minerals from leased lands under the proposed action, the precise quantities of direct and indirect CO<sub>2</sub>e emissions that may result from development of those lands, and the emissions that may result from other regional and national activities, the data presented above show BLM Wyoming’s limited potential contribution to global emissions, and its minor potential to affect the rate of climate change relative to the latest iteration of the carbon budget projections.

## 5.2 Greater Sage Grouse

### 5.2.1 Greater Sage-grouse - Affected Environment

Conservation of the Greater Sage-grouse (*Centrocercus urophasianus*) and their habitats has been a critical contemporary land-management issue for the BLM, the public, and the BLM's partner agencies across the West.

The Greater Sage-grouse currently occupies approximately about one-half of their historic distribution. On October 2, 2015, the U.S. Fish and Wildlife Service (FWS) published its finding that listing of the Greater Sage-grouse under the Endangered Species Act of 1973 was not warranted. The FWS's finding was based, in part, on the conservation strategies developed in Wyoming and other states which led the FWS to conclude that "the primary threats to greater sage-grouse have been ameliorated by conservation efforts implemented by Federal, State, and private landowners." (80 FR 59858, dated October 2, 2015). As the FWS also acknowledged (*id.* at page 59882):

The key component of the Wyoming Plan is the application of State regulatory measures associated with the Wyoming Plan on all lands in Wyoming... The Federal Plans in the State incorporate the Wyoming strategy,<sup>[44]</sup> thereby ensuring implementation of the strategy on Federal land surfaces and subsurface regardless of the need for a State permit (see further discussion below). The completion of the Federal plans also facilitates greater coordination between the State and Federal agencies in implementing and monitoring the Wyoming Plan. This addition to the Wyoming Plan further increases the value of this effort in conserving sage-grouse by covering all lands in the State with a single regulatory framework to reduce affects to sage-grouse in the most important habitats in the State. Therefore, the strategy conserves sage-grouse through an effective regulatory mechanism for conservation.

For BLM-administered public lands in Wyoming, the BLM adopted the State's Greater Sage-grouse conservation strategy by revising and amending its RMPs. The State of Wyoming's Core Area Protection strategy for Greater Sage-grouse "is based on the principle that conservation of important habitat essential to the maintenance of Greater sage-grouse and activities important to the State's economy are not mutually exclusive." (State of Wyoming Governor's Executive Order 2019-3, at Appendix A, page 5). The important habitat areas referred to in Executive Order (EO) 2019-3 are the Core Population Areas (CPAs), Connectivity Areas and Winter Concentration Areas designed by the State of Wyoming's Sage-Grouse Implementation Team (SGIT). These CPAs encompass approximately 83% of the Greater Sage-grouse population within the State (see 80 FR 59882) as identified by peak male lek attendance, and were mapped by the SGIT to:<sup>45</sup>

...assimilate[] the highest sage-grouse density areas identified [in published conservation studies] as they were identified as the most productive habitats for sage-grouse in Wyoming. In addition, the mapping of Core Areas considered current and potential energy development and encapsulated areas historically low in production [citation omitted]...

Leasing is generally a three-step process. First, the BLM issues a resource management plan (RMP), as required by FLPMA, assessing the resources in a given area to determine what lands to open for development (43 C.F.R. § 1601.0-5(n)). Here, the BLM adopted the State of Wyoming's Core Area Protection strategy and issued the Approved Resource Management Plan (ARMPA) for Greater Sage-Grouse in the Casper, Kemmerer, Newcastle, Pinedale, Rawlins and Rock Springs Field Office (signed September 2015).

Step two in the leasing process, after the RMP has been signed, is to identify parcels eligible for lease, subject to public protest, and hold a competitive lease sale at which parcels are auctioned off and sold to the highest bidder (see 43 C.F.R. § 3120.1-3, 43 C.F.R. § 3120.5-1, 43 C.F.R. § 3120.5-3). For the third and final step, after leases are

---

<sup>44</sup> On August 1, 2008, the Wyoming Governor issued Executive Order 2008-2, establishing a "core population area strategy" for Greater Sage-grouse in Wyoming. This Executive Order has since been re-issued (June 2, 2011 as EO 2011-5; July 29, 2015 as EO 2015-4 and, most recently, on August 21, 2019 as EO 2019-3). The BLM and State of Wyoming use identical core population area boundaries; see [https://eplanning.blm.gov/epl-front-office/projects/lup/36597/130805/159604/RMP\\_Maint\\_2017-001\\_Sage-Grouse\\_Core\\_V4.pdf](https://eplanning.blm.gov/epl-front-office/projects/lup/36597/130805/159604/RMP_Maint_2017-001_Sage-Grouse_Core_V4.pdf)

<sup>45</sup> Gamo, R.S., and Beck, J.L., 2017, Effectiveness of Wyoming's sage-grouse core areas: Influences on energy development and male lek attendance: *Environmental Management*, v. 59, no. 2, p. 189-203.

issued, the lessees submit proposals to develop the leases. Prior to any surface disturbance occurring, an Application for Permit to Drill (APD) must be submitted and approved (43 C.F.R. § 3162.3-1) by the field office. For each APD the Bureau determines whether to approve the proposals and what conditions to impose (30 U.S.C. § 226(g) and 43 C.F.R. § 3162.3-1).

More specifically during the leasing stage, an Expression of Interest (EOI) for potential fluid mineral development is submitted by a proponent, to the BLM Wyoming State Office (WSO). The WSO stops accepting new EOIs approximately six (6) months ahead of a sale. For example, the WSO stops accepting EOIs for a December Competitive Lease Sale (CLS) on June 1<sup>st</sup>. WSO staff reviews all EOIs to determine if the BLM administers the minerals and the minerals are available for lease (e.g. unencumbered by existing leases or areas that are withdrawn from minerals development). Those EOIs that are available for development are combined, if submitted by the same proponent and conforming to the size requirements described in 43 CFR § 3110.3-3 (b) and 43 CFR § 3120.2-3, and then moved forward in the leasing process. For additional information see Section 1.2 of the EA.

After each EOI is combined, the WSO creates a shapefile of all parcels. The shapefile is used in the ArcGIS® mapping program (ArcMap®). Using GIS, WSO screens all parcels to determine which parcels move forward for further review by the field offices. Each field office (FO) with potential parcels within its boundaries receives a list to review containing only those parcels.

The field offices use the same ArcMap® system to screen the proposed parcels. This screen is based on the Resource Management Plan (RMP) decisions in each FO. The field office reviews the potential parcels and recommends; which lands need to be removed from further consideration (e.g. lands unavailable for lease due to RMP decisions; which lands need to be deferred (potential conflicts that may have arisen); and leasing stipulations based on RMP decisions). These recommendations are forwarded to the district offices.

The district office (DO) staff compiles all parcels within the district and verifies the recommendations from each FO within the district. Any discrepancies are discussed between the FO and DO staff to resolve those issues. The DO then sends the compiled list back to the WSO, specifically the fluid minerals staff.

The fluid minerals staff then compiles all three DO recommendations and potential parcels back into one list. The State Director (SD) and the District Managers (DMs) then coordinate and discuss the recommendations and concur on which potential parcels, or portions of parcels move forward for analysis and inclusion into the quarterly CLS environmental assessment (EA).

The WSO fluid minerals staff prepares the EA and posts it on the ePlanning website for a 30-day public comment period. After the 30-day public comment period, the fluid minerals staff reviews and responds to the comments and makes changes to the EA if necessary. Any major conflicts identified are discussed with the SD and Deputy State Director (DSD) for Lands and Minerals (and other staff if determined necessary by the SD) for a decision on whether to delete, defer or move the parcel forward.

The public comments and responses are then posted on ePlanning for a 30-day protest period. After the 30-day protest period, the fluid minerals staff reviews the protests and prepares responses. Once the protest responses are completed, the fluid minerals staff sends the EA, Finding of No Significant Impact (FONSI), Response to Public Comments, Response to Protests and Decision Record (DR) to other WSO staff for review, comment and approval. These reviews and approvals are typically obtained from the Planning and Environmental Coordinator(s), Branch Chiefs, DSDs and finally the SD. The SD typically signs the DR the day prior to the CLS. At any point in the review process (up until the SD signature), parcels or portions of parcels may be deleted or deferred.

To incorporate further analysis into the leasing stage, the 2015 ARMPA states;

*“Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).*

*Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts to sage-grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases (ARMPA FEIS, pg. 2-13)."*

In order to accomplish the prioritization from the ARMPA, the BLM issued Instruction Memorandum 2016-143 (WO-IM-2016-143) on September 1, 2016. The objective of the IM was to:

*"...ensure, consistency across BLM offices when implementing the GRSG (Greater Sage-Grouse) Plans decisions aimed at avoiding or limiting new surface disturbance in Priority Habitat Management Areas (PHMA), including Sagebrush Focal Areas (SFAs), and minimizing surface disturbance in General Habitat Management Areas (GHMA); and to provide clarity to the BLM Field Offices on how to move forward with oil and gas leasing and development activities within GRSG habitats."*

WO-IM-2016-143 further stated;

*"This guidance is not intended to direct the Authorized Officer to wait for all lands outside of GRSG habitat areas to be leased or developed before allowing leasing within GHMAs, and then to wait for all lands within GHMAs to be lease before allowing leasing and development within the next habitat area (PHMA, for example). Rather it is intended to ensure consideration of the lands outside of GHMAs and PHMAs for leasing and development before considering lands within GHMAs and, therefore, to ensure consideration of lands within GHMAs for leasing and development before considering lands within PHMAs for leasing and development in an effort to focus future surface disturbance outside of the most important areas for sage-grouse conservation consistent with the conservation objectives and provisions in the GRSG Plans."*

Recent scientific publications<sup>46</sup> indicate that though strategies such as this "may be successful at limiting sage-grouse range-wide population declines, if implemented, [] the conservation measures are not expected to reverse the declines, particularly where active oil and gas operations are present." However, these publications also "support the conclusion that overall the Wyoming Governor's Executive Order is helping safeguard critical sage-grouse habitats at the State-wide scale."

On December 27, 2017, WO IM 2016-143 ("Implementation of Greater Sage-grouse Resource Management Plan Revisions or Amendments -Oil & Gas Leasing and Development Sequential Prioritization") was rescinded and replaced with WO IM No. 2018-026 ("Implementation of Greater Sage-grouse Resource Management Plan Revisions or Amendments -Oil & Gas Leasing and Development Prioritization Objective"). WO IM 2018-026 specifies that: "The GRSG Plans established an objective to prioritize oil and gas leasing and development outside of GRSG habitat management areas, but to allow for leasing with appropriate stipulations on all BLM mineral estate designated in the GRSG Plans as "open" for leasing. In effect, the BLM does not need to lease and develop outside of GRSG habitat management areas before considering any leasing and development within GRSG habitat. This policy should allow for the BLM to efficiently conduct lease sales and permit oil and gas development while still protecting GRSG and GRSG habitat."

On March 15, 2019 the Wyoming Greater Sage-Grouse Approved Resource Management Plan Amendment and Record of Decision was signed. This amendment clarified and/or modified some of the original decisions from the 2015 ARMPA. For example, in the 2015 ARMPA, Management Decision (MD) Special Status Species (SSS) 12 for noise stated, "New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges (ARMPA ROD, pg. 37)." The updated language in the 2019 amendment stated, "Within

---

<sup>46</sup> Hanser, et al., 2018, Greater sage-grouse science (2015–17)—Synthesis and potential management implications: U.S. Geological Survey Open-File Report 2018–1017, 46 p., <https://doi.org/10.3133/ofr20181017> at pages 2, 14.

PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming’s Executive Order 2015-4) (see MD SSS 4). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate.” Through a District of Idaho court decision (*Western Watersheds Project et al v Schneider*, 1:16-cv-00083-BLW) BLM was enjoined from implementing the 2019 BLM Sage-Grouse Plan Amendments for Idaho, Wyoming, Colorado, Utah, Nevada/Northeastern California, and Oregon, until such time as the Court can adjudicate the claims on the merits. The 2015 Plans remain in effect during this time.

On February 27, 2020, a separate court decision from the District of Idaho (*Western Watersheds Project et al v. Bernhardt*, 1:18-cv-00187-REB) enjoined certain provisions of the WO-IM-2018-026 and replaced them with provisions from the WO-IM-2010-117. Finally, a third case from the District of Montana (*Montana Wildlife Federation v. Bernhardt*, 4:18-cv-00069-BMM) vacated IM-2018-026. Due to these decisions, BLM WSO is in the process of developing a new strategy to prioritize leasing within sage-grouse habitats.

For the EA, BLM WSO has reviewed the 2015 ARMPA and State of Wyoming Executive Order 2019-3. Within the ARMPA it states;

*“In November 2014, the USGS<sup>[47]</sup> released their Report on Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Mainer et al. 2014). The purpose of this report is to provide a reference for land managers and others who are working to develop biologically relevant and socioeconomically practical buffer distances around sage-grouse habitats. The Proposed LUP Amendments, in accordance with the State of Wyoming’s Core Area Strategy, impose restrictions targeted to the individual threats to breeding and nesting activity in Greater Sage-Grouse habitat. In light of the USGS report, the USFWS<sup>[48]</sup> has indicated that the Core Area Strategy’s overlapping and reinforcing mechanisms gives the USFWS confidence that the lek-buffer distances in the State’s Core Area Strategy will be protective of breeding sage-grouse for habitat within the State of Wyoming. The buffers in the Proposed LUP Amendments (consistent with the State’s Core Areas Strategy) were designed based on recommendations from biologists in the USFWS, BLM, and WGFD<sup>[49]</sup>, and based on WAFWA<sup>[50]</sup> standards. Thus, the findings of the Buffer Study have not been incorporated into the Proposed LUP Amendments. Adaptive Management—Identification of hard and soft adaptive management triggers for population and habitat and identified appropriate management responses.” (ARMPA FEIS, pg. 2-2)*

General Core Area Protection Strategy Directives (EO 2019-3) states, in part:

*Where consistent with the Greater sage-grouse conservation goals set forth by EO 2019-3, a non-regulatory approach should be used to influence management actions and activities within EO-delineated habitats. Wyoming’s Core Area Protection Strategy is based on the principle that conservation of important habitat essential to the maintenance of Greater sage-grouse and activities important to the State’s economy are not mutually exclusive. Protective measures are designed to avoid, minimize and mitigate impacts to the species with compensatory mitigation employed only where avoidance and minimization are either inadequate or impossible (Appendix A, pg. 5).*

*State-federal coordination, in concert with coordination efforts that include other relevant stakeholders, should collaboratively maintain a beneficial balance between Greater sage-grouse protection and Wyoming’s economy.*

<sup>[47]</sup> USGS – United States Geological Service

<sup>[48]</sup> USFWS – United States Fish and Wildlife Service

<sup>[49]</sup> WGFD – Wyoming Game and Fish Department

<sup>[50]</sup> WAFWA – Western Association of Fish and Wildlife Agencies

Pages 5-6 of Appendix A (EO 2019-3), continues by stating (Under Federal Agency Coordination, BLM and USFS):

*Through the Office of the Governor and as informed by the recommendations provided by SGIT, EO 2019-3 requires that the State of Wyoming cooperate with the federal government regarding federal land use issues concerning multiple use of federal lands in Wyoming pursuant to Wyoming Statute § 9-1-207. In turn, the federal agencies consult with the State and local governments to carry forth their responsibilities and mandates under FLPMA, NFMA, and applicable regulations.*

*Consistent cross-jurisdictional coordination across state and federal land management boundaries is crucial to ensure the landscape-scale viability of the species and is the touchstone for the Wyoming Core Area Protection Strategy. Recognizing the importance of coordinated management across boundaries, both the BLM and USFS have entered into Memoranda of Understanding/Agreement with the State of Wyoming to outline the commitments and responsibilities of both parties. These agreements aim to enhance the management and protection of Greater sage-grouse and its habitat on federally managed public lands.*

*State agencies shall work with federal land management partners to adhere to their respective federal directives under Greater sage-grouse plan amendments to:*

- 1. Perform timely reviews on proposed projects in Greater sage-grouse habitat on public lands managed by the BLM and USFS to determine whether the proposed projects comply with the State's Core Area Protection Strategy (Appendix E).*
- 2. Work jointly with the federal agencies to provide guidance if compliance would require the implementation of avoidance, minimization or compensatory mitigation measures. Should mitigation measures be determined to be required, the State will apply the Compensatory Mitigation Framework as outlined by Appendix F (Compensatory Mitigation).*
- 3. Follow coordination guidance as applicable under existing or future Memoranda of Understanding or Agreements.*

Appendix E of EO 2019-3 is titled Greater Sage-Grouse Population Areas, Permitting Process, and Stipulations for Development. Within this Appendix, the EO outlines the Density and Disturbance Calculation process (pg. 3-6), which is referred to as the Density and Disturbance Calculation Tool (DDCT). General stipulations are described beginning on page 7 of the appendix. For Non-Core Areas within 2 Miles of an Occupied Lek (pg. 9) the stipulations state:

*Surface Disturbance*

*There are no limitations to disturbance outside the 0.25 mile no surface occupancy buffer.*

*Surface Occupancy*

*Within 0.25 miles of the perimeter of occupied Greater sage-grouse leks there will be NSO. NSO, as used in these recommendations, means no permanent surface facilities including roads shall be placed within the NSO area. Other activities may be authorized with the application of appropriate seasonal stipulations, provided the resources protected by the NSO are not adversely affected. For example, underground utilities may be permissible if installation is completed outside applicable seasonal stipulation periods and significant resource damage does not occur.*

*Seasonal Use*

*Activity will be allowed from July 1 to March 14 outside of the 0.25 mile perimeter of an occupied lek and within 2 miles from the perimeter of the occupied lek where breeding, nesting and early brood-rearing habitat is present. Activities in unsuitable habitat may also be approved year-round (including March 15 to June 30) on a case-by-case basis. Activities may be allowed during seasonal closure periods as determined on a case-by-case basis.*

The 2015 ARMPA has similar stipulations for General Habitat Management Areas (GHMA). Management Decision (MD) Special Status Species (SSS) 6 (ARMPA ROD, pg. 36) for sage-grouse leks outside PHMAs states:

*Surface occupancy and surface disturbing activities will be prohibited on or within a 0.25 mile radius of the perimeter of occupied sage-grouse leks (Map 2-8).*

*The AO may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of GRSG.*

While MD SSS 9 for sage-grouse breeding, nesting and early brood-rearing habitat outside PHMA states:

*Surface disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect sage-grouse nesting and early brood rearing habitats within 2 miles of the lek or lek perimeter of any occupied lek located outside PHMAs.*

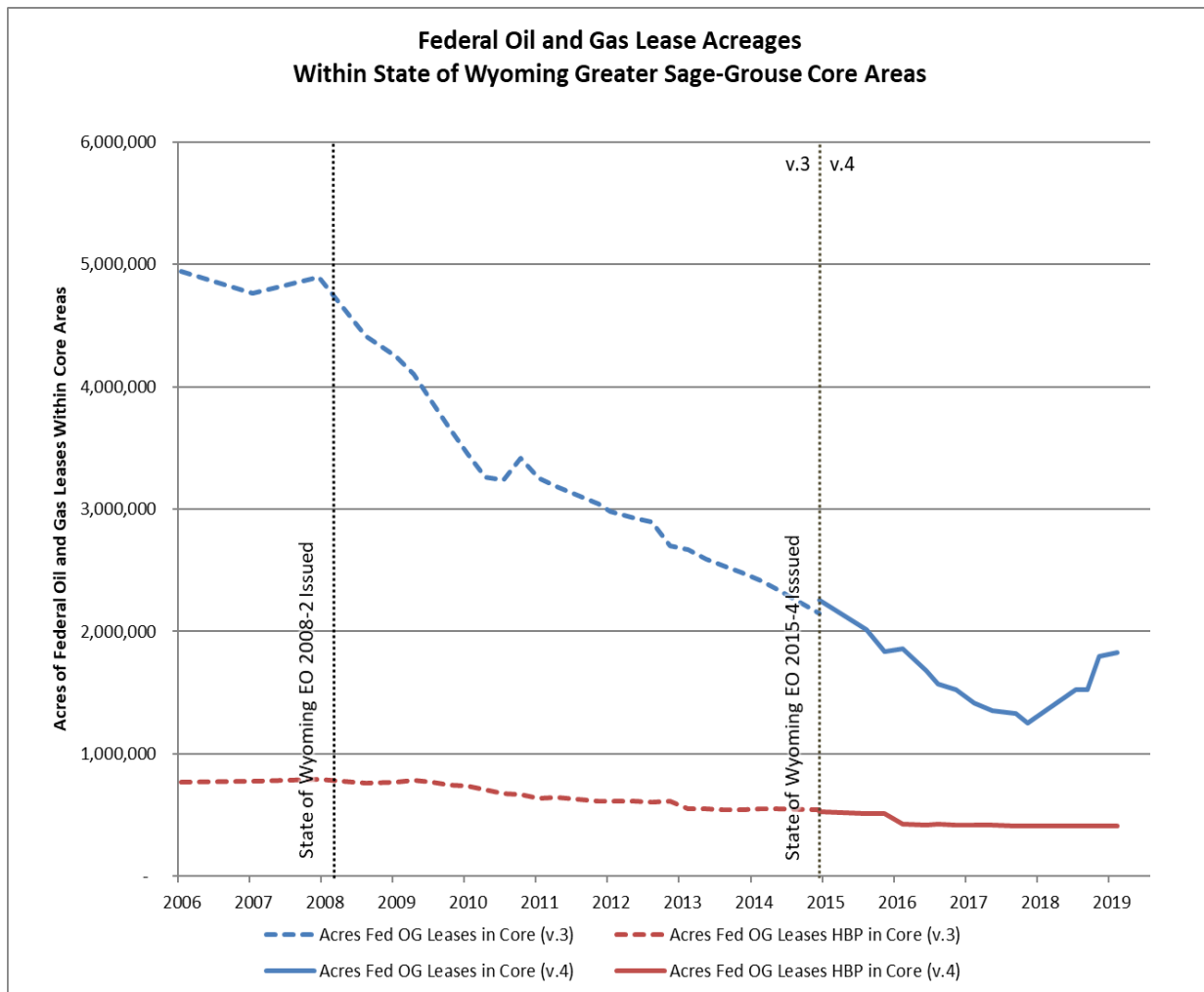
*Where credible data support different timeframes for this restriction, dates can be shifted by 14 days prior or subsequent to the above dates.*

These ARMPA decisions are attached to lease parcels, in GHMA, as appropriate (Appendix 5.4). The stipulation codes are WY\_SW\_NSO\_GHMAL and WY\_SWTLS\_GHMAL (Appendix 5.4.1). Once these stipulations, as appropriate, are added to a lease parcel, the preliminary parcel list is sent to the field offices for further review as discussed above. The BLM WSO also coordinates with the WGFD during review of the preliminary parcel list and WGFD typically provides comments to the EA.

Since the ARMPA indicated that prioritization would occur for leasing and development, along with the decisions from the court cases, the WSO has taken the following approach for this sale. Identify all parcels outside of sage-grouse habitat (parcels that are not completely or partially within GHMA or PHMA) and lease according to the appropriate stipulations from the field office RMP. Identify parcels that are completely within designated GHMA (if any portion of a GHMA parcel contained PHMA, the entire parcel was considered a PHMA parcel). Those parcels completely within GHMA were then reviewed to verify that the BLM is using the most current GHMA/PHMA boundaries, the most current lek location database information (maintained by WGFD) and most current Winter Concentration Area locations are reviewed in relation to the parcels, before being considered for sale offering. BLM WSO has applied the most current stipulations to each parcel, as appropriate, and sent those parcels to the field office for review.

At this time, BLM WSO is choosing to defer any parcel that is completely or partially within designated PHMA. PHMA parcels will be reviewed for lease in the future once development of the BLM WY prioritization strategy has been fully developed and implemented.

Since the BLM, State of Wyoming, and other partners began development and implementation of the current sage-grouse conservation strategy in 2008, there has been a 63% reduction in the area of Federal oil and gas leases in Core Population Areas. Similarly, there has been a 48% reduction in the area of Federal oil and gas leases that are Held by Production (HBP) within Core Population Areas.



Maps displaying the location of existing Federal oil and gas leases and the proposed oil and gas lease sale parcels in relation to Greater sage-grouse designated habitat management areas are provided in Appendix 5.7.

The WGFD's 2017 Sage-Grouse Job Completion Report (JCR) describes recent Greater sage-grouse population trends (at pages 6-7):

*From 2013-2016, average lek size increased 112%. In 2017, average lek size declined 11%, then declined another 18% in 2018 to nearly equal the 10-year (2008-2017) average of 25.9 males/active lek. Thus, there has been a long-term decline and short-term cyclic increases and decreases in the statewide sage-grouse population. The short-term trends in statewide populations are believed to be largely weather related ....*

*For the 10-year period (2009-2018), average male lek attendance ranged from 16.8 males/lek in 2013, the lowest average males per lek since 1997, to a high of 35.6 males/lek in 2016....*

*The proportion of active, occupied leks remained stable at 82% in 2016, 80% in 2017, and 79% in 2018.*

Of the parcels nominated (128) and available for lease (123), BLM deferred 2 parcels in order to work with current operators and complete plugging operations and deferred one parcel to complete tribal consultation prior to leasing. The remaining 120 preliminary parcels were then screened to identify which parcels were not in sage-grouse habitat, GHMA and PHMA. Of the 120 parcels none are located outside of sage-grouse habitats. Fifty-nine (59) parcels are located either completely or partially within PHMA and will be deferred until a later time. This leaves 61 parcels,

containing approximately 63,313.42 acres to be offered. None of the parcels are located in Connectivity or in a mapped Winter Concentration Area.

None of the GHMA parcel have known occupied leks within their boundaries, while eight (8) are located within 2 miles of an occupied lek (WY-202Q-0781, -0823, -0824, -0829, -6224, -6907, -6969 and -6965). These parcels have the stipulation attached, as appropriate (Appendix 5.4).

### 5.2.2 Greater Sage-grouse - Environmental Impacts

Of the 61 parcels being offered in GHMA, 41 are within one mile of an existing Federal lease that is held by actual production. Of those only three parcels do not adjoin an existing lease that is currently held by actual production, all but 3 (-0733, -0827 and -6961) are adjacent to an authorized lease. While not in PHMA and subject to the same CSU, with today's horizontal drilling technology, development of parcels that are adjacent to producing leases are more likely to be able to occupy existing disturbance which will consolidate anthropogenic disruptions and minimize new disturbance. Development of the subject parcels could result in greater levels of habitat fragmentation and potentially increased noise levels.

All parcels offered in this sale include Standard Lease Notice 3:

*The lease may in part, or in total, contain important Greater sagegrouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the Greater sage-grouse populations and habitat quality. Such measures shall be developed during the Application for Permit to Drill (APD) on-site and environmental review process and will be consistent with the lease rights granted.*

Parcels offered in GHMA's will be offered subject to the appropriate Greater sage-grouse stipulations (Appendix 5.4), in conformance with the BLM's recent RMP revisions and amendments to provide for conservation of Greater sage-grouse and their habitats.

On August 1, 2019, the U.S. Forest Service announced "proposed changes to how the agency manages greater sage grouse in Colorado, Idaho, Nevada, Wyoming, and Utah after hearing concerns from states and land users."<sup>51</sup> The proposed parcels located on USFS-administered lands comply with the approved land use plan(s). See also 84 FR 37233-37234.

### 5.2.3 Greater Sage-grouse - Cumulative Impacts

There are approximately 15,854,692 acres of PHMA in the State of Wyoming. Of this acreage, approximately 2,044,997 acres is under Federal lease (12.9%) as of October 1, 2019. Additionally, approximately 78,290 acres were offered in the 3<sup>rd</sup> Quarter 2019 sale, 84,611 acres in the 4<sup>th</sup> Quarter 2019 sale, and approximately 34,133 acres in the 1<sup>st</sup> Quarter 2020 sale. While the Proposed Action does not contain any parcels located within designated PHMA (wholly or partially), the cumulative addition of the proposed acreage to be offered (and if sold) would create additional, contractual rights. The new rights would be subject to timing limitation stipulations (TLS) and no surface occupancy (NSO) stipulations for sage-grouse leks and habitat (as appropriate) within GHMA. Impacts (direct and/or indirect) beyond those analyzed in the underlying RMP FEIS' and the ARMPA FEIS, are not expected due to the continual expiration of existing federal leases whether because they lack production in paying quantities or are never explored. Additional coordination with WGFD will occur for all projects proposed in Greater Sage-grouse habitats as determined necessary, and in accordance with the BLM-WGFD interagency MOU. See Appendix 5.7 for relevant maps.

---

<sup>51</sup> <https://www.fs.fed.us/news/releases/usda-releases-proposed-amendments-greater-sage-grouse-land-management-plans>

## **5.3 Big Game**

### **5.3.1 Big Game – Affected Environment**

General information regarding wildlife species and impacts in the subject planning areas can be found at the following locations:

BFO – Leasing (DEIS Ch. 3 pg. 269-274 and Ch. 4 pg. 693-721; FEIS Ch.3 pg. 410-415 and Ch. 4 pg. 844-871), Wildlife (DEIS Ch. 3 pg. 327-354 and Ch. 4 pg. 976-1027; FEIS Ch.3 pg. 469-496 and Ch. 4 pg. 1119-1167)

CFO – Leasing (DEIS Ch. 3 pg. 3-20 – 3-29 and Ch. 4 pg. 4-33 – 4-43; FEIS Ch. 3 pg. 3-20 – 3-29 and Ch. 4 pg. 4-33 – 4-43), Wildlife (DEIS Ch. 3 pg. 3-53 – 3-65 and Ch. 4 pg. 4-98 – 4-133; FEIS Ch. 3 pg. 3-53 – 3-64 and Ch. 4 pg. 4-98 – 4-133)

WFO/CYFO (Bighorn Basin) – Leasing (DEIS Ch. 3 pg. 514-537 and Ch. 4 pg. 832-857; FEIS Ch. 3 pg. 3-53 – 3-70 and Ch. 4 pg. 4-82 – 4-110), Wildlife (DEIS Ch. 3 pg. 579-591 and Ch. 4 pg. 962-1000; FEIS Ch. 3 pg. 3-107 – 3-117 and Ch. 4 pg. 4-225 – 4-269)

KFO – Leasing (DEIS Ch. 3 pg. 3-21 – 3-26 and Ch. 4 pg. 4-27 – 4-34; FEIS Ch. 3 pg. 3-23 – 3-28 and Ch. 4 pg. 4-28 – 4-34); Wildlife (DEIS Ch. 3 pg. 3-55 – 3-65 and Ch. 4 pg. 4-83 – 4-106; FEIS Ch. 3 pg. 3-59 – 3-69 and Ch. 4 pg. 4-89 – 4-114)

LFO – Leasing (DEIS Ch. 3 pg. 364-384 and Ch. 4 pg. 756-779; FEIS Ch.3 pg. 334-350 and Ch. 4 pg. 693-718), Wildlife (DEIS Ch. 3 pg. 435-450 and Ch. 4 pg. 910-961; FEIS Ch. 3 pg. 395-406 and Ch. 4 pg. 850-901)

RSFO – Leasing (Green River RMP ROD pg. 12 and Jack Morrow Hills/Green River RMP Amendment pg. 49-54), Wildlife (Green River RMP ROD pg. 24-25 and Jack Morrow Hills/Green River RMP Amendment pg. 41-48, GR RMP FEIS 347- 352)

RFO – Leasing (DEIS Ch. 3 pg. 3-33 - 3-35 and Ch. 4 pg. 4-66 - 4-68 and 4-57 - 4-58; FEIS Ch. 3 pg. 3-37 - 3-39 and Ch. 4 pg. 4-107 - 4-109), Wildlife (DEIS Ch. 3 pg. 3-127 - 3-146 and Ch. 4 pg. 4-208 - 4-224 and 4-237 - 243; FEIS Ch. 3 pg. 3-141 - 3-161 and Ch. 4 pg. 4-450 - 4-472 and 4-482 - 4-485)

NFO – Leasing (FEIS Ch. 3 pg. 68-72 and Ch. 4 pg. 125-126), Wildlife (FEIS Ch.3 pg. 113-119 and Ch. 4 pg. 148-153)

PFO - Leasing (DEIS Ch. 3 pg. 3-36 - 3-42 and Ch. 4 pg. 4-46 - 4-58 and 4-70 - 4-78; FEIS Ch. 3 pg. 3-36 - 3-42; FEIS Ch. 4 pg. 4-49 - 4-61 and 4-73 - 4-81), Wildlife (DEIS Ch. 3 pg. 3-115 - 3-134 and Ch. 4 pg. 4-180 - 4-192 and 4-208 - 4-211; FEIS Ch. 3 pg. 3-127 - 3-147 and Ch. 4 pg. 4-213 - 4-228 and 4-244 - 4-248)

ARMPA - Leasing (FEIS Ch. 3 pg. 3-97 - 3-130; Wildlife (FEIS Ch. 3 pg. 3-462 – 3-523)

**Information regarding populations of big game species found in these planning areas can be found at the following locations:**

Pronghorn – Casper RMP DEIS pg. 3-59, FEIS pg. 3-58; Buffalo RMP DEIS pg. 331-332, FEIS pg. 474-475; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-110 – 3-111; Kemmerer RMP DEIS pg. 3-60, FEIS pg. 3-63 – 3-64; Lander RMP DEIS pg. 443, FEIS pg. 400-401; Newcastle RMP FEIS pg. 115; Pinedale RMP DEIS pg. 3-116, FEIS pg. 3-128; Rawlins RMP DEIS pg. 3-131 - 3-133, FEIS pg. 3-147 - 3-148; Rock Springs (Green River) RMP FEIS pg. 347-348, 381

Mule Deer – Casper RMP DEIS pg. 3-59, FEIS pg. 3-58; Buffalo RMP DEIS pg. 332-333, FEIS pg. 475-476; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-111; Kemmerer RMP DEIS pg. 3-59 – 3-60, FEIS pg. 3-63; Lander RMP DEIS pg. 443, FEIS pg. 401; Newcastle RMP FEIS pg. 115; Pinedale RMP DEIS pg. 3-116, FEIS pg. 3-128;

Rawlins RMP DEIS pg. 3-131 and 3-133 - 3-134, FEIS pg. 3-147 - 3-149; Rock Springs (Green River) RMP FEIS pg. 347, 381

Elk – Casper RMP DEIS pg. 3-59, FEIS pg. 3-59; Buffalo RMP DEIS pg. 334-335, FEIS pg. 476-477; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-111; Kemmerer RMP DEIS pg. 3-61 – 3-62, FEIS pg. 3-64 – 3-65; Lander RMP DEIS pg. 443, FEIS pg. 401; Newcastle RMP FEIS pg. 115; Pinedale RMP DEIS pg. 3-116, FEIS pg. 3-128; Rawlins RMP DEIS pg. 3-131 and 3-135, FEIS pg. 3-147 and 3-150; Rock Springs (Green River) RMP FEIS pg. 348-349, 381

Moose – Buffalo RMP DEIS pg. 335-336, FEIS pg. 477-478; Bighorn Basin RMP DEIS pg. 586, FEIS pg. 3-111; Kemmerer RMP DEIS pg. 3-58 – 3-59, FEIS pg. 3-62; Lander RMP DEIS pg. 444, FEIS pg. 401-402; Pinedale RMP DEIS pg. 3-116, FEIS pg. 3-128; RSFO RMP FEIS pg. 349, 381

Bighorn Sheep – Casper RMP DEIS pp. 3-59 – 3-60, FEIS pg. 3-59; Bighorn Basin RMP DEIS pg. 586, FEIS pg. 3-112; Lander RMP DEIS pg. 444, FEIS pg. 402; Rawlins RMP DEIS pg. 3-131 and 3-135, FEIS pg. 3-147 and 3-150; RSFO RMP FEIS pg. 349

White-tailed Deer – Casper RMP DEIS pg. 3-59, FEIS pg. 3-59; Buffalo RMP DEIS pg. 333-334, FEIS pg. 476; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-111; Lander RMP DEIS pg. 443, FEIS pg. 401; Newcastle RMP FEIS pg. 115; Rawlins RMP DEIS pg. 3-131 and 3-133 - 3-134, FEIS pg. 3-147 - 3-149; RSFO RMP FEIS N/A

**Specific information regarding habitats used by big game species found in these planning areas can be found at the following locations:**

ARMPA- FEIS pg. 3-462 - 523, 4-423 - 427

Pronghorn – Casper RMP DEIS pg. 3-59, FEIS pg. 3-58 – 3-59; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-110 – 3-111; Kemmerer RMP DEIS pg. 3-60 – 3-61, FEIS pg. 3-64; Lander RMP DEIS pg. 443, FEIS pg. 400-401; Newcastle RMP FEIS pg. 115; Pinedale RMP DEIS pg. 3-116 - 3-117, FEIS pg. 3-128 - 129; Rawlins RMP DEIS pg. 3-132 - 3-133, FEIS pg. 3-147 - 3-148; Rock Springs (Green River) RMP FEIS pg. 194, 221-222, 341, 347-348, 355-357, 360-363, 401

Mule Deer – Casper RMP DEIS pg. 3-59, FEIS pg. 3-59; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-111; Kemmerer RMP DEIS pg. 3-59 – 3-60, FEIS pg. 3-63; Lander RMP DEIS pg. 443-444, FEIS pg. 401; Newcastle RMP FEIS pg. 115; Pinedale RMP DEIS pg. 3-117, FEIS pg. 3-129; Rawlins RMP DEIS pg. 3-133 - 3-134, FEIS pg. 3-148 - 3-149; Rock Springs (Green River) RMP FEIS pg. 130-131, 194, 200, 206-207, 221-222, 341, 343, 347, 353, 355-357, 360-363, 400

Elk – Casper RMP DEIS pg. 3-59, FEIS pg. 3-59; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-111; Kemmerer RMP DEIS pg. 3-61, FEIS pg. 3-65; Lander RMP DEIS pg. 443, FEIS pg. 401; Newcastle RMP FEIS pg. 115; Pinedale RMP DEIS pg. 3-117 - 3-118, FEIS pg. 3-129 - 3-130; Rawlins RMP DEIS pg. 3-134 - 3-135, FEIS pg. 3-149 - 3-150; Rock Springs (Green River) RMP FEIS pg. 38, 42-43, 130-131, 193, 206-207, 221, 341, 343, 344, 347-348, 353-356, 361-363, 402

Moose – Bighorn Basin RMP DEIS pg. 586, FEIS pg. 3-111; Kemmerer RMP DEIS pg. 3-59, FEIS pg. 3-62 – 3-63; Lander RMP DEIS pg. 444, FEIS pg. 401-402; Pinedale RMP DEIS pg. 3-118, FEIS pg. 3-130; Rock Springs (Green River) RMP FEIS pg. 221, 348, 352, 355, 363, 403

Bighorn Sheep – Casper RMP DEIS pp. 3-60, FEIS pg. 3-59; Bighorn Basin RMP DEIS pg. 586, FEIS pg. 3-112; Lander RMP DEIS pg. 444, FEIS pg. 402; Rawlins RMP DEIS pg. 3-135, FEIS pg. 3-150; Rock Springs (Green River) RMP FEIS pg. 349, 355, 363, 403

White-tailed Deer – Casper RMP DEIS pg. 3-59, FEIS pg. 3-59; Bighorn Basin RMP DEIS pg. 585, FEIS pg. 3-111; Lander RMP DEIS pg. 443, FEIS pg. 401; Newcastle RMP FEIS pg. 115; Rawlins RMP DEIS pg. 3-133 - 3-134, FEIS pg. 3-148 - 3-149;

## Big Game Herd Units

The distribution and abundance of big game in the planning area are primarily a function of habitat quality and quantity, the availability of water, climate/weather, and the ability to move, or migrate between seasonal habitats.

The WGFD manages big game populations in herd units (HU). Herd unit boundaries generally do not match BLM field office boundaries, making analysis and correlation of resource data and big game population data difficult. The WGFD revises its population objectives for each big game species based on new habitat information, population trends, recreation demand, and public input.

The health of big game populations are generally inferred from population objectives set by the WGFD. Based on their monitoring, population objectives of mule deer and pronghorn in several SW-WY hunt unit areas have been below objective for several years. According to the WGFD's 2019 Job Completion Reports, pronghorn hunt areas within the Rock Springs, Kemmerer, Rawlins and Pinedale field offices range from 8.2 % below target (Carter Lease) to 44.6% below target (Uinta/Cedar Mountain). Similarly, numbers for mule deer range from 5.1% below (Baggs) to 57.1% below (South Rock Springs). See Table 23, below for specific information regarding parcel location, [mule deer](#) herd objectives, and estimated populations, as reported by the WGFD Big Game 2019 Job Completion Report.

### *Mule Deer*

Of the parcels evaluated, the vast majority are located in the following HU's: Sublette (53 parcels), Cheyenne River (26 parcels), North Converse (31 parcels and shares one with Pumpkin Buttes and 3 with North Natrona) and Wyoming Range (9 parcels). The remaining parcels are scattered among five (5) other HUs in all three DO's. See Table 23 below for a list of HUs and parcel descriptions.

In general, the HUs that are located in HPD which are below population objective are predominantly privately owned. Major land uses in these HUs are traditional ranching and grazing with oil and gas and coal development. Periodic disease outbreaks (i.e. hemorrhagic diseases) are possible in some of these HUs and can contribute to population declines when environmental conditions are suitable. Similarly, the HUs in the WR/BBD that are below population objective have periodic disease outbreaks. In addition, the WR/BBD HUs have been subject to periods of drought which have helped depress populations. Scattered oil and gas development occurs throughout the WR/BBD HUs.

With the exception of the Baggs Herd Unit, the herd units in the HDD have not been meeting population objectives for several years. For example, the Sublette mule deer herd unit was negatively affected by harsh winter conditions and subsequent die off along with 100% fawn mortality in isolated areas, during the winter of 2016-2017. This herd was similarly affected by harsh winter conditions in 2010-2011 that was likely exacerbated by sustained drought conditions for most of the 2000's. These conditions were in addition to intense oil and gas development on the Pinedale Anticline; exceptions for crucial winter range timing limitations were initially authorized in 2005. And were made permanently available for the life of the project in accordance with the Pinedale Anticline ROD. The vast majority of the Mesa within the northern Pinedale Anticline field is within crucial winter range for Mule Deer. See ARMPA pages 4-423 – 4-425 for a discussion of research results emanating from studying this herd during a period of intensive development. Recent data suggests that while these initial study results were accurate, to date, mule deer are not habituating even as large parts of the field are being reclaimed. To date, the PFO has not recommended any changes through the adaptive management process for this project. Additional study and coordination with the WGFD and local partners, is continuing.

But, as noted in the Pinedale RMP DEIS, pg. 146 (1986): "Mule deer populations in the planning area have a history of severe fluctuation. Most of the drastic population declines are attributable to severe winter conditions. Mortality may reach 30-50 percent of the population under certain conditions." Historic information regarding population objectives and estimated populations can be found in these documents: (Pinedale RMP DEIS, pg. 144 (1986), Green River RMP DEIS pg. 427 (1992), and the Medicine Bow DEIS RMP pg. 197-199 (1987). Further information can also be found in the Baggs Mule Deer Crucial Winter Range Analysis Report (WGFD, 1994). Prior to the winter of 2016-2017, the Sublette HU had been on an upward trend (since 2012) and was near the 32,000 objective (28,509) according to prior year WGFD JCRs.

The Wyoming Range Mule Deer Herd has experienced challenges similar to those observed in the Sublette Herd. Most notably, the 2016, 2017 and 2018 WGFD Jackson Region Job Completion Reports (JCRs) indicate that, “Sustained population growth has been difficult because of the frequency of high overwinter mortality every 3 years on crucial winter ranges, low vigor and productivity of important winter range browse, and reduced fawn survival and recruitment. In March 2013 the Wyoming Range Mule Deer Project was launched. The overall goal of this project is to address important research and management needs identified by the Wyoming Mule Deer Initiative and Wyoming Range Mule Deer Initiative. An important aspect of this research is to investigate relationships between mule deer population dynamics, energy development and disturbance, habitat conditions and climate to provide a mechanistic approach to monitoring and management of mule deer (Appendix A)” Appendix D, in the 2016 Jackson Region JCR (pg. 34) indicates the annual fawn survival for most mule deer populations is often lower than adult survival, and it is not uncommon for less than half of the fawns born in June to make it through their first year of life. In the first year of research evaluating survival of fawns, 45% of fawns born in summer 2015 survived until June 2016; only 17% of annual mortalities occurred during winter. Unfortunately, survival of fawns born in summer 2016 tells a much different story. As of March 5, 2017, only one of the 70 fawns tracked was still alive – which equates to a 99% mortality of fawns.

<b>Table 23: Mule Deer Herd Units (204Q)</b>							
<b>DISTRICT OFFICE</b>	<b>FIELD OFFICE</b>	<b>HERD UNIT</b>	<b>WGFD 2019 Population Objective</b>	<b>WGFD Population Estimate, 2019</b>	<b>Status meeting Objective</b>	<b># Parcels within</b>	<b># Overlap</b>
HDD	RFO	Baggs	19,000	18,026	5.1% Below	8	
HDD	RFO, RSFO	Sublette	32,000	20,846	34.9% Below; 3 years	47	2
HDD	PFO	Wyoming Range	40,000	31,000	22.5% Below; 3 years	2	2
HPD	NFO, BFO, CFO	Cheyenne River	27,000	24,974	7.5 % Below; 10 years	26	
HPD	CFO	Pumpkin Buttes	13,000	14,518	12% Above	1	1
HPD	CFO	North Converse	9,000	7,021	22% Below; 11 years	25	4
HPD	CFO	North Natrona	4,700	3,696	21.4% Below; 5 years		3
WR/BBD	WFO	Southwest Bighorn	16,000	10,893	31.9% Below; 20 years	5	

#### *Crucial Winter Range*

Of the parcels evaluated, twenty-three (23) contain approximately 12,987.57 acres of mule deer crucial winter range (CWR) including five (5) in the PFO, eight (8) in RFO, seven (7) in RSFO, and three (3) in the WFO. Of these parcels, only 10 (WY-204Q-0759, 0760, 0765, 0766, 0767, 0824, 0827, 6224, 6732 and 6932) containing approximately 4,979.79 acres would be offered for the December lease sale, while the other thirteen would be deferred at this time.

Fifty-five (55) of the evaluated parcels, whole or in part, contain pronghorn antelope crucial winter range (approximately 60,219.01 acres); three parcels in CFO, eight parcels in PFO, five parcels in RFO, thirty-four parcels in RSFO and five parcels in WFO. Twelve of these parcels (WY-204Q-0760, 0765, 0766, 0767, 0817, 0823, 0824, 6732, 6932, 6933, 6960 and 6961), containing approximately 7,991.15 acres would be available for lease during the December CLS. The remaining 41 would be deferred at this time.

An additional nineteen parcels evaluated, whole or in part, intersect elk crucial winter range (approximately 18,095.28 acres); including eighteen in the RSFO and one in the RFO. None of the nominated parcels are within either the elk feedgrounds or the elk managed parturition habitat (see Maps in Appendix 5.7). All of these parcels would be deferred at this time.

#### *Migration Corridors*

Research into the movements of mule deer in large numbers and at seasonal transition times, has resulted in the formal identification of migratory pathways resulting in the identification of State-recognized corridors.

As discussed in the WGFD's UNGULATE MIGRATION CORRIDOR STRATEGY (February 4, 2016): Sawyer and Kauffman (2011) found that approximately 95% of the migratory period is spent foraging at stopover areas. Habitat quality is higher in stopover habitat than in the area between stopover sites. In this study, deer used the same stopover areas between years during all migratory periods. Avoidance of disturbance on and around stopover areas was important to migrating ungulates while disturbance in the areas between stopover areas was tolerated.

Lendrum et al. (2012) and Sawyer et al. (2013) found that given an increase in disturbance, ungulates may modify the timing of migration, constrict the size of the area used for migration and move through areas of increased development faster. Changing the timing of migration or moving from one seasonal range to another faster (e.g. winter range to summer range) results in the loss of synchronization between plant green-up and ungulate movements thereby reducing energy intake (Sawyer and Kauffman 2011). Both Lendrum et al. (2012) and Sawyer et al. (2013) found correlations between disturbance levels and measurable changes in animal response as indicated by their movement rate and locations. Sawyer et al. (2013) found ungulates moved through disturbed areas faster, detoured around disturbance, and reduced their use of stopover areas, thus constricting their migration both temporally and spatially. Importantly, both studies recommended keeping the standard for allowable disturbance within migration corridors below the level of detected impact. (@ page 3:

[https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Habitat%20Information/Ungulate-Migration-Corridor-Strategy\\_Final\\_020416.pdf](https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Habitat%20Information/Ungulate-Migration-Corridor-Strategy_Final_020416.pdf), accessed 2/9/19)

This same document (at 4) also noted:

*It is also important to understand that migratory behavior can be lost (Bolger et al. 2008, Harris et al. 2009) and loss of the ability to migrate has led to sudden and dramatic declines in animal populations (Bolger et al. 2008). Migration is a learned behavior that may be difficult to reestablish once lost or diminished (Sawyer et al. 2013).*

Acting under this strategy, the State of Wyoming has developed new methods for mapping these migration corridors and stopover areas. As a result of these new methods, the first mule deer migration corridor (MDC) designated was the Red Desert to Hoback (RD2H) which occurred on December 5, 2016. The Red Desert to Hoback corridor is the longest mule deer migration route ever recorded in the lower 48 states (WGFD, <https://wgfd.wyo.gov/News/Infrastructure-improvement-made-on-open-range-to-h>, accessed 2/9/2018).

New research data has also been produced as a result of these efforts. This research has provided a finer level of understanding into where migrating mule deer spend the most time (stopovers) during migration, where there are existing barriers or bottlenecks that constrict movement along the corridor. Other research has suggested that the vegetation within the corridors may be extensively used as forage by the herd as they migrate between winter and summer habitats, twice a year.

Other new research suggests that migratory behavior must be learned. The loss of corridor function is known to cause a migratory population to forget their migratory behavior under the most extreme of circumstances, including knowledge of where the main route is in the landscape. Questions remain regarding why corridors are where they are.

During initial coordination with the WGFD and during preparation of this EA, the BLM and WGFD discussed proposed lease sale parcels located in areas with the State of Wyoming-designated mule deer migration corridors. This initial coordination resulted in identification of ~~fifteen-twenty-seven (27+5)~~ parcels that were wholly or

partially within the corridors. Specifically, parcels WY-204Q-0755, 0759, 0760, 0765, 0766, 6224, 6732 and 6932 intersected the Baggs migration corridor while parcels WY-204Q-0767, 0774, 0775, 0779, 0788, 0791, 0792, 0794, 0798, 0799, 0807, 0809, 0821, 6879, 6935, ~~and 6936~~, 6949, 6950 and 6961 intersected the RD2H mule deer corridor. Only parcels WY-204Q-0767, 0792 and 6961 (RD2H) and WY-0759, 0760, 0765, 0766, 6224, 6732 and 6932 (Baggs) would be offered during the December lease sale. WGFD also requested a ‘Special Lease Notice’ be attached to these parcels; BLM has subsequently attached the subject Special Lease Notice to these parcels. The special lease notice can be located on each subject parcel in Appendix 5.4 and the general Special Lease Notice language in Appendix 5.4.1.

The WGFD has identified additional priority migration corridors for mule deer herd units in Wyoming. Other areas under review by the WGFD but are not designated include Wyoming Range and Dubois. The WGFD has collected mule deer movement data to some degree in each of these areas and are currently working with stakeholders and agency personnel to identify related research and proactive conservation actions that are geared toward conserving habitats in each of these herd areas.

The WGFD has also identified two research priorities in Wyoming including the Carter Mountain pronghorn herd and the Powder River/Pumpkin Buttes mule deer herds. “The Carter Mountain Pronghorn herd traverses several State Highways in an area locally known as Antelope Alley. Wildlife/vehicle collisions are a concern and managers would like to document fine scale movement patterns and begin working on conservation measures for this pronghorn population. Mule deer in the Powder River/Pumpkin Buttes herds cross Interstate 90. Current knowledge regarding movements for this mule deer herd is based on general field observations and wildlife/vehicle collision data.”

The Sublette pronghorn herd has also been identified for further analysis; the BLM and WGFD continue to fund research into big game behavior as a result of development occurring within the Pinedale and Rawlins field offices. There is no other new information regarding pronghorn or other big game species in the subject field offices.

### **5.3.2 Big Game – Environmental Impacts**

Information regarding impacts expected from development to big game and big game habitats, including Crucial Winter Range and Migration, can be found here. Migration of big game were specific issues raised by the public in the Pinedale and Rawlins RMP EIS development process. Migration was also a specific consideration in the Green River RMP EIS.

Buffalo RMP DEIS (pg. 714-715, 981-982, 1013, 1019-1020 and 1024-1025); FEIS (pg. 846-847, 866, 1121, 1155, 1162 and 1167)

Casper RMP DEIS (pg. 3-20 – 3-29, 3-53 – 3-64, 4-33 – 4-37, 4-42 – 4-43, 4-98 – 4-106 and 4-127 – 4-133; FEIS (4-98 – 4-99, 4-108, 4-114, 4-119, 4-124, 4-129)

Bighorn Basin RMP DEIS (pg. 841-843, 853-857, 965-970 and 997); FEIS (4-90 – 4-92, 4-105 – 4-106, 4-229 – 4-233, 4-256 – 4-259)

Kemmerer RMP DEIS (pg. 4-28 – 4-30, 4-33 – 4-34, 4-83 – 4-90, 4-102 – 4-104, 4-106); FEIS (pg. 4-89, 4-91 – 4-96, 4-110 – 4-111)

Lander RMP DEIS (pg. 774, 777, 910-915, 920-922); FEIS (pg. 711, 714-715)

ARMPA- FEIS pages 4-423 - 427

Pinedale RMP FEIS pg 2-104, 2-114, 2-141, 2-142, 2-149, 2-156, 4-214 – 4-228 4-244 – 4-247, 4-255, 257

Rawlins RMP FEIS pg 2-106, 2-107, 3-91, 3-147, 3-148, 4-226

Kemmerer RMP FEIS: 2-29, 2-52/53, 2-60, 3-59, 3-136, 4-111, 4-126

Green River RMP FEIS: 24, 29, 32, 34, 194

Newcastle RMP FEIS: 149, 151-152

Offering parcels in Mule Deer, Pronghorn or Elk CWR is not expected to result in new impacts beyond those identified in the base RMPs cited above. Development on these parcels could contribute to additional habitat fragmentation, activity, and noise; depending upon the proposal and status of existing development if/where present, and the cumulative level of activity. Introduction of weeds, invasive, noxious, or annuals, can outcompete native vegetation degrading the quality of habitat up to decreasing the carrying capacity of the land which can then cause loss of genetic viability if sustained over long periods of time.

Development of parcels located in big game habitats can result in negative impacts. Whether occurring in a corridor or in other seasonal habitats, oil and gas related disturbance can result in wildlife shifting their foraging behavior from utilizing high quality habitat to areas of lower quality, less desirable habitat. Abandonment of important habitat can lower reproduction and survival rates of the species and result in a decline in wildlife populations.” (ARMPA, 4-426) Over utilization can occur as a result, further limiting the productive nature of the land and sustaining the population at hand. The effects can be more pronounced when additional restrictions on access occurs either through fences or other man-made intrusions, other land uses are competing for the same range resources, or when conditions such as drought or other climatic occurrences, affect growth and/or vegetation regeneration rates, including fire (Rawlins RMP 4-455, 4-456).

While multiple, overlapping timing stipulations can provide benefit to wildlife resources by preventing sustained disruptive activity, the Pinedale RMP FEIS, p 4-60 (2006), also notes “[W]hen areas with greater sage-grouse nesting restrictions overlap areas with big game crucial winter range restrictions, the oil and gas operator would potentially be restricted to a 3-and-a-half-month construction, drilling, and well completion season. This short drilling and development window in areas such as the Pinedale Anticline has led to accelerated operations, which results in congested traffic on primary access roads and a potential overload on local service and emergency resources. It also causes a yearly bust-and-boom cycle for the local communities as crews move in during the open development window then leave when the seasonal restrictions are invoked.” This situation can be exacerbated when lease development is further reduced by other seasonal restrictions, including those for raptors.

Of the five parcels, proposed for sale in December, located within the Baggs MD HU, parcel 6732 is partially located within the Atlantic Rim Natural Gas Project area, parcel 6224 is within the Continental Divide-Creston Natural Gas Project area and portions of parcel 0765 are located within the South Baggs Natural Gas Development Project area. Impacts to CWR within these areas would be similar to those described within the project area EIS.

For the Sublette mule deer herd unit, four whole parcels and portions of one other are proposed for the December sale. Winter survival, habitat condition and quality on winter ranges, and habitat loss from development (industrial and residential) are the primary issues influencing this herd. In the past ten years this herd has experienced three winters with above average fawn mortality. Gas field development associated with the Pinedale Anticline overlaps crucial winter range located on the Mesa, resulting in less forage available for wintering deer within and adjacent to development. Parcels 6960 and portions of 0817 are within the Pinedale Anticline Oil and Gas Development Project area. Only parcel 0767 contains crucial winter range and is located approximately three miles southeast of Superior, WY.

For the December sale, two whole parcels (0824 and 6961) and portions of one other (0823) are located within the Wyoming Range HU. These parcels are located approximately five miles east of Marbleton, WY and only parcel 0824 contains mule deer CWR (approximately 14.8 acres). Development, if any, in these parcels is expected to be mostly exploratory. The issues with this herd are expected to continue to be the driving factors affecting the inability of this herd to grow and meet the expectation of the public.

Twenty-six of the proposed parcels are within the Cheyenne River MD HU. The Cheyenne River MD HU is approximately 7.5% below population objective. The dominant land use in this area is livestock grazing, however, there are areas of crop production on private lands. In addition, there are several large surface coal mines in the herd unit, and well development in northern Niobrara County has begun to increase disturbance and one parcel (WY-

204Q-0734) is located within the proposed Converse County Oil and Gas Project area. None of the proposed parcels within this herd unit contain CWR.

Fourteen whole parcels evaluated for the December sale are within the North Converse MD HU, three are within both the North Converse and the North Natrona herd units, and one parcel is in both North Converse and Pumpkin Buttes herd units. All of these parcels are within sixteen miles of Midwest and Edgerton. This particular herd unit is 22% below population objective. Public hunting access within the herd unit is poor, with only small tracts of accessible public land interspersed with predominantly private lands. Primary land uses include oil and gas production, large-scale wind generation, In-situ uranium production and livestock grazing. None of the proposed parcels are within CWR.

#### Migration Corridors

There would be no direct impacts to Migration Corridors from the proposed action; indirect impacts from nearby development on Federal and/or non-Federal lands could increase the pace of movement by herds through the corridor depending upon the intensity and timing of nearby operations.

Deferring the offering of one parcel (0755) in the Baggs corridor, and most of the parcels that intersect wholly or partially with the Sublette (RD2H) corridor will benefit big game in the short-term. These parcels would most likely be reviewed again for a future sale. If sold, the BLM would work with the lessee and WGFD to minimize any impacts at the site specific development level.

Introduction of weeds, invasive, noxious, or annuals, can outcompete native vegetation degrading the quality of habitat that is necessary to sustain animals during migration or interrupt and/or change vegetation associated with seasonal changes.

Whether occurring in a corridor or in other seasonal habitats, disturbance associated with oil and gas development can result in wildlife moving from high quality habitat to areas of lower quality, less desirable habitat. Abandonment of important habitat can lower reproduction and survival rates of the species and result in a decline in wildlife populations.” (ARMPA, pg 4-426)

The intensity of development and resultant impacts will be considered in combination with the context of the proposed action at the time development is proposed.

### **5.3.3 Big Game – Cumulative Impacts**

There are over 16.6 million acres of big game crucial winter range (CWR) in the State of Wyoming. Of this amount, approximately 6,335,000 acres is Mule Deer CWR, 5,973,000 acres is Antelope CWR, and 4,361,359 acres is Elk CWR.

As of end of fiscal year 2019, 9.7 percent of mule deer CWR is currently under Federal lease, 17.3 percent of antelope CWR is under Federal lease and 8.9 percent of elk CWR is under Federal lease.

Offering 4,979.79 acres of mule deer CWR and 7,716.76 acres of pronghorn CWR is not expected to result in impacts not already considered in BLM’s RMPs or programmatic EIS’.

Oil and gas development causes surface disturbance through construction of well pads, roads, pipelines, and other facilities. Reclamation and mitigation efforts would reduce impacts on wildlife habitat and fisheries; however, construction and maintenance of roads and well pads and the presence of humans would result in long-term or permanent impacts. Cumulative impacts would likely be greater where mineral development is more intense, in areas where development overlaps with crucial and winter wildlife ranges, and on state and private lands because of the lack of protections afforded to natural resources in these areas. If development expands, the ability of big game and other wildlife species to disperse into alternate habitats, they could become limited. This may create isolated populations in areas where habitats remain intact. The degree of impact would depend on the timing of development activities and whether the amount of activity outpaces the successful reclamation and revegetation efforts in disturbed areas. Because of this pace of development (whether federal mineral, commercial, or private residence),

more pressure would be put on habitats outside of the development (likely private lands) as wildlife is displaced from the disturbances.

It is well known that CWR is important to the viability of big game. Persistent disturbance in sensitive habitats would shift the areas of use and weaken the tendency of the animals to return to the disturbed area. If animals return to disturbed habitat, populations could be lower and use of the habitat could be unpredictable. Mineral development activities would likely cause displacement of animals and selection of alternative habitats and would likely inhibit big game movement between winter ranges and birthing areas. The displacement of big game, and specifically mule deer, from high-use to low use areas has the potential to influence survival and reproduction (Sawyer et al. 2006). Should migration be disrupted and key habitats highly degraded over a short period of time, it is likely that negative effects (both in the short-term and potentially in the long-term) from displacement of big game from these habitats would occur.

As considered in the RMPs (ARMPA FEIS pg. 4-466 - 4-467, BFO FEIS pg. 2489) the Converse County project is undergoing EIS analysis within the HPD. Cumulative impacts to resources are being evaluated within these documents.

Where parcels are not located within approved project area EIS boundaries, and even to a certain extent those that are, as more reservoir data is gathered through exploratory drilling, the likelihood for sustained economic production should increase, and a decrease in dry-holes should occur consistent with other types of field development. BLM is unaware of any new concentrated field developments beyond what is currently proposed and undergoing review. See ARMPA FEIS pg. 4-509 - 4-579, the Buffalo RMP FEIS pg. 871, 1167 and 1660-1665, Bighorn RMP FEIS pg. 4-642 - 4-674, and Lander RMP FEIS pg. 1276-1332 for more information on what activity was considered in the RMP cumulative impacts analysis.

In particular, in its analysis of impacts of impacts from oil and gas development, the ARMPA at page 4-508, concludes:

*Loss of vegetation from development activities would degrade habitat and increase forage competition among grazing animals. Livestock grazing practices would further increase cumulative impacts through direct competition for forage, water, and space, and by limiting the ability to manage vegetation for fish and wildlife needs. These impacts would also reduce the capability to maintain current population objectives.*

*Oil and gas development would cause the greatest amount of surface disturbance through construction of well pads, roads, pipelines, and other facilities. Reclamation and mitigation efforts would reduce impacts on wildlife habitat and fisheries; however, construction and maintenance of roads and well pads and the presence of humans would result in long-term or permanent impacts. Cumulative impacts would likely be greater where mineral development is more intense, in areas where development overlaps with crucial and winter wildlife ranges, and on state and private lands because of the lack of protections afforded to natural resources in these areas. Protection of non-federally listed species on private and state lands may not occur, resulting in potentially significant impacts on these species. As development expands throughout southwestern Wyoming, the ability of big game species to disperse into habitats outside of the planning area may become limited. This may create isolated populations in areas where habitats remain intact. The degree of impact would depend on the timing of development activities and whether the amount of activity outpaces the successful reclamation and revegetation efforts in disturbed areas. Because of this pace of development (whether federal mineral, commercial, or private residence), more pressure would be put on habitats outside of the development (likely private lands) as wildlife is displaced from the disturbances.*

*Impacts on wildlife would likely occur under all alternatives because of the loss of habitat. The success of disturbed land reclamation, both short- and long-term, would determine the duration of impacts. Given the constancy of all other stressors, the potential for cumulative impacts would be greatest under Alternative A because of anticipated increases in development and fewer restrictions on such activity on public lands.*

There are no pending APD actions for any of the proposed parcels. Potentially significant impacts to migration and big game habitats were forecast to occur as a result of development in the approved project areas. These parcels

would contribute and potentially expand the cumulative area of both direct and indirect effects. Within the Green River RMP FEIS (at 462) impact analysis indicates that “the capability of habitat to meet herd unit objective levels would likely be significantly affected” in the Sublette HU. Development of parcels in combination with other existing and/or future development could contribute to these significant impacts.

Where parcels are located outside of approved project areas, and if they are developed, an increase in exploratory activity could occur if conditions are favorable. Due to the scattered nature of the parcels, this activity could occur where there is little to no development currently. Due to the fractured nature of the fluid mineral estate in the HPD and in SE WY, most development is being sited on private or state lands resulting in off-lease federal production. In these cases, the State of Wyoming has primary jurisdiction for ensuring operations are compliant with state rules for the protection of surface lands.

The likelihood of an increase in activity in the HDD is likely low while continued exploratory and some development activity increases in the HPD. Exploratory and development activity could increase in the WR/BBD due to the number of previously nominated parcels, however, it is unknown as to what extent. As of the end of fiscal year 2018, less than 50% of all leases issued are explored. Results of this lease sale are expected to be consistent. To the extent that existing oil and gas development is affecting big game herds, those impacts are expected to continue. New development would be consistent with current projections in the RMPs and are not expected to be at a level that would cause significant impacts beyond those reflected in the RMP FEIS’. Impacts from other risk factors are expected to continue.

Best management practices will be considered and where required by stipulation, a mitigation plan will be developed to ensure that RMP objectives are achieved. Lease Notices and coordination with State Agencies will ensure cooperation and coordination across jurisdictions increasing the consistency in application of mitigation and consideration of cumulative impacts. Master development plans will be considered as appropriate.

Conditions at the time an APD is submitted will be assessed for significance; the need for additional mitigation will also be determined at the time development is proposed. All future projects will under-go site-specific review, and preparation of an environmental record of review will occur in accordance with Federal law, regulation, and policy.

While parcels containing lands within the designated migration corridors are being offered without any stipulations controlling occupancy, those parcels which contain mapped migratory corridor boundaries have sufficient acreage outside of the affected habitat to site infrastructure, should the parcel move to development. The State of Wyoming/WGFD, has not objected to offering any of the parcels proposed to be offered. The two agencies continue to cooperate in accordance with Secretarial Order 3362 and the BLM-WGFD Memorandum of Understanding.

All oil and gas projects in the state are subject to State of Wyoming rules and require approval of an Application for Permit to Drill by both agencies if the proposal involves production of the Federal mineral estate.

Monitoring and the use of adaptive management will continue in accordance with any applicable decision. As data is collected and made available, it will be considered at the time development is proposed, if a parcel is sold, a lease issued and development proposed.

Additional information on cumulative impacts to big game and big game habitats are provided in the ARMPA at pages 4-423 – 4-427, 4-562, 4-508; the Pinedale RMP FEIS 4-294 – 296, GR RMP FEIS 462.

In consideration of the above, no significant cumulative impacts are expected from the offering of the ~~one~~ parcels located in mule deer CWR or to migrating animals and/or the continued use and function of the ~~Baggs~~ migration corridors from offering the proposed parcels for sale.

## 5.4 Lease Sale Parcel List with Proposed Stipulations and Noted Deletions/Deferrals

<p>WY-204Q-0717 2077.700 Acres T.0380N,R.0620W, 06th PM, WY Sec. 006 LOTS 7; 006 SESW; 008 W2W2,NENE; 009 NESW,S2SW,SE; 010 W2; 021 N2NW,SWNW; 022 NESW; 028 W2NE,NW,N2SE; 034 E2SE; 035 ALL; Niobrara County Newcastle FO Formerly Lease No. Stipulations: Lease Notice No. 1 Lease Notice No. 2 Lease Notice No. 3 Lease Stipulation No. 1 Lease Stipulation No. 2 Lease Stipulation No. 3 NSO (1) as mapped on the Newcastle Field Office GIS database; (2) protecting 0.25-mile buffer for nesting raptors. TLS (1) Feb 1 to Jul 31; (2) as mapped on the Newcastle Field Office GIS database; (3) protecting nesting raptors. CSU (1) Surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) entire lease; (3) protecting cultural and scenic values of the Cheyenne-Deadwood Trail. CSU (1) Surface occupancy or use may be restricted or prohibited if paleontological sites exist unless paleontological sites are avoided or the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) entire lease; (3) protecting Lance Creek Formation paleontological values.</p>	<p>TBNG2002-CSU-03 (Sec. 12: N2,SW,NESE,S2SE)</p> <p>WY-204Q-0722 955.130 Acres T.0430N,R.0630W, 06th PM, WY Sec. 017 NESW,S2SW; 018 LOTS 4; 018 SESW; 020 N2NE,NENW; 023 SE; 024 SWNW,SW,SWSE; 026 NE,E2NW; Weston County Newcastle FO Formerly Lease No. THUNDER BASIN NG - 1140 Stipulations: Lease Notice No. 1 Lease Notice No. 2 Lease Notice No. 3 Lease Stipulation No. 1 Lease Stipulation No. 2 Lease Stipulation No. 3 TBNG-R2-FS-2820-13 Lease Notice TBNG2002-NSO-02 (Sec. 17: portions of NESW; Sec. 18: portions of Lot 4; Sec. 18: portions of SESW; Sec. 23: portions of N2SE, SESE; Sec. 26: portions of NE,E2NW) TBNG2002-NSO-06 (Sec. 23: portions of NESE Sec. 24: portions of SWNW, NWSW) TBNG2002-CSU-03 (Sec. 17: NESW,S2SW; Sec. 18: Lot 4; Sec. 18: SESW; Sec. 20: N2NE,NENW; Sec. 23: SE; Sec. 24: SWNW,SW,SWSE; Sec. 26: NE,E2NW)</p>	<p>TBNG2002-NSO-02 (Sec. 19: portions of Lot 2; Sec. 28: portions of N2S2; Sec. 30: portions of N2NE, SENW; Sec. 32: portions of N2NE) TBNG2002-NSO-03 (Sec. 19: Lots 2,3, portions of Lot 4; Sec. 19: S2SE; Sec. 30: N2NE,SENE, portions of SWNE,SENW) TBNG2002-NSO-06 (Sec. 32: portions of NWNE) TBNG2002-TL-02 (Sec. 32: portions of N2NE) TBNG2002-TL-06 (Sec. 19: Lots 2,3, portions of Lot 4; Sec. 19: S2SE; Sec. 30: N2NE,SENE, portions of SWNE,SENW) TBNG2002-CSU-01 (Sec. 19: Lot 4, portions of Lot 3; Sec. 28: portions of N2S2; Sec. 30: Lot 1; Sec. 30: portions of SENW) TBNG2002-CSU-03 (Sec. 19: Lots 2-4; Sec. 19: S2SE; Sec. 28: N2S2; Sec. 29: E2SE; Sec. 30: Lot 1; Sec. 30: NE,SENW; Sec. 32: N2NE) TBNG2002-CSU-05 (Sec. 19: portions of Lots 2,3; Sec. 19: SESE, portions of SWSE; Sec. 30: NENE, portions of NWNE,SENE;</p>
<p>WY-204Q-0721 600.000 Acres T.0410N,R.0630W, 06th PM, WY Sec. 012 N2,SW,NESE,S2SE; Weston County Newcastle FO Formerly Lease No. THUNDER BASIN NG - 916 Stipulations: Lease Notice No. 1 Lease Notice No. 2 Lease Notice No. 3 Lease Stipulation No. 1 Lease Stipulation No. 2 Lease Stipulation No. 3 TBNG-R2-FS-2820-13 Lease Notice TBNG2002-NSO-02 (Sec. 12: portions of NE,NESE,SESE)</p>	<p>WY-204Q-0725 760.970 Acres T.0410N,R.0640W, 06th PM, WY Sec. 019 LOTS 2-4; 019 S2SE; 028 N2S2; 029 E2SE; 030 LOTS 1; 030 NE,SENW; 032 N2NE; Weston And Niobrara Counties Newcastle FO Formerly Lease No. THUNDER BASIN NG - 750 WYOMING ACQUIRED Stipulations: Lease Notice No. 1 Lease Notice No. 2 Lease Notice No. 3 Lease Stipulation No. 1 Lease Stipulation No. 2 Lease Stipulation No. 3 TBNG-R2-FS-2820-13 Lease Notice TBNG2002-NSO-01 (Sec. 32: portions of N2NE)</p>	<p>WY-204Q-0726 40.000 Acres T.0410N,R.0640W, 06th PM, WY Sec. 028 SWNW; Weston County Newcastle FO Formerly Lease No. thunder basin NG - 1066 Wyoming acquired Stipulations: Lease Notice No. 1 Lease Notice No. 2 Lease Notice No. 3 Lease Stipulation No. 1 Lease Stipulation No. 2 Lease Stipulation No. 3 TBNG-R2-FS-2820-13 Lease Notice TBNG2002-CSU-01 (Sec. 28: portions of SWNW) TBNG2002-CSU-03 (Sec. 28: SWNW)</p> <p>WY-204Q-0728 120.000 Acres T.0430N,R.0640W, 06th PM, WY Sec. 012 N2NE,SWNE; Weston County Newcastle FO Formerly Lease No. THUNDER BASIN NG - 1060 Stipulations: Lease Notice No. 1 Lease Notice No. 2 Lease Notice No. 3 Lease Stipulation No. 1 Lease Stipulation No. 2 Lease Stipulation No. 3 TBNG-R2-FS-2820-13 lease Notice</p>

TBNG2002-NSO-02 (Sec. 12: portions of N2NE,SWNE)  
 TBNG2002-NSO-06 (Sec. 12: portions of N2NE,SWNE)  
 TBNG2002-TL-01 (Sec. 12: N2NE,SWNE)  
 TBNG2002-CSU-03 (Sec. 12: N2NE,SWNE)

WY-204Q-0729 39.790 Acres  
 T.0410N,R.0640W, 06th PM, WY  
 Sec. 003 LOTS 1;  
 Weston County  
 Newcastle FO  
 Formerly Lease No.  
 THUNDER BASIN NG - 1141  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 TBNG-R2-FS-2820-13 Lease Notice  
 TBNG2002-CSU-03 (Sec. 3: Lot 1)

WY-204Q-0731 80.000 Acres  
 T.0430N,R.0660W, 06th PM, WY  
 Sec. 011 S2SW;  
 Weston County  
 Newcastle FO  
 Formerly Lease No.  
 THUNDER BASIN NG - 717  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 TBNG-R2-FS-2820-13 Lease Notice  
 TBNG2002-CSU-03 (Sec. 11: S2SW)

WY-204Q-0733 600.000 Acres  
 T.0390N,R.0670W, 06th PM, WY  
 Sec. 008 E2,N2NW,SE;W;  
 009 W2W2;  
 Converse County  
 Casper FO  
 Formerly Lease No.  
 THUNDER BASIN NG - 1116  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 TBNG-R2-FS-2820-13  
 TBNG2002-NSO-01 (Sec. 8: portions of SENW;)  
 TBNG2002-NSO-02 (Sec. 8: portions of S2NE,NWNW,SE;W;  
 Sec. 9: portions of W2W2;)  
 TBNG2002-CSU-03 (Sec. 8: E2,N2NW,SE;W;  
 Sec. 9: W2W2;)

TBNG2002-LN-01 (Sec. 8: E2, N2NW, SENW; Sec. 9: W2W2;)

WY-204Q-0734 116.090 Acres  
 T.0390N,R.0690W, 06th PM, WY  
 Sec. 001 N2SE;  
 006 LOTS 6;  
 Converse County  
 Casper FO  
 Formerly Lease No.  
 THUNDER BASIN NG - 1099  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 TBNG-R2-FS-2820-13  
 TBNG2002-NSO-01 (Sec. 1: portions of N2SE;)  
 TBNG2002-NSO-02 (Sec. 1: portions of N2SE;)  
 TBNG2002-NSO-06 (Sec. 1: portions of NWSE;)  
 TBNG2002-TL-02 (Sec. 1: NWSE; portions of NESE;)  
 TBNG2002-CSU-03 (Sec. 1: N2SE; Sec. 6: Lot 6;)  
 TBNG2002-CSU-07 (Sec. 1: N2SE;)

WY-204Q-0738 2482.450 Acres  
 T.0400N,R.0770W, 06th PM, WY  
 Sec. 002 S2N2,S2  
 003 LOTS 1,2;  
 003 S2NE,SE;  
 005 LOTS 1;  
 005 SENE,E2SE;  
 006 LOTS 1-7;  
 006 S2NE,SE;W,E2SW,W2SE;  
 006 SESE;  
 007 LOTS 1-4;  
 007 E2,E2W2;  
 011 N2N2;

Converse And Natrona Counties  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3

WY-204Q-0741 1136.760 Acres  
 T.0360N,R.0770W, 06th PM, WY  
 Sec. 002 LOTS 3;  
 002 S2NW,E2SE;  
 006 LOTS 5,7;  
 006 E2SW,W2SE;  
 007 LOTS 1-4;  
 007 W2NE,SENE,E2NW,NESW;  
 014 SE;  
 023 S2NE,NESW,NWSE;  
 Converse And Natrona Counties  
 Casper FO

Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
 CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
 TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only).  
 TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-grouse that attend leks within designated PHMAs (Core only).  
 CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss.  
 This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-grouse designated PHMAs (Core only). The surface occupancy restriction criteria identified in this stipulation may

preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Casper Field Office GIS database; (3) protecting big game on crucial winter range.

WY-204Q-0742 560.000 Acres

T.0360N, R.0770W, 06th PM, WY

Sec. 012 S2NE, NW, S2;

Converse County

Casper FO

Formerly Lease No.

WYW 182959X SAND SPRING UNIT

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only). TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-grouse that attend leks within designated PHMAs (Core only).

CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the

cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-grouse designated PHMAs (Core only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

**DELETE ENTIRE PARCEL:  
(560.000 Acres) which is within the Sandhills Management Area. This Management Area is administratively closed to oil and gas leasing under the Casper RMP.**

**Delete the following:**

**T.0360N, R.0770W, 06th PM, WY  
Sec. 012 S2NE, NW, S2;**

WY-204Q-0743 2400.000 Acres

T.0360N, R.0770W, 06th PM, WY

Sec. 013 N2;

014 N2, SW;

015 E2;

022 E2;

023 N2N2, SWNW, NWSW, S2S2;

023 NESE;

024 NWNW, SW;

027 E2;

Converse County

Casper FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS

database; (3) protecting cultural and scenic values of the Bozeman Trail. CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail. TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only). TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-grouse that attend leks within designated PHMAs (Core only).

CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-grouse designated PHMAs (Core only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

**DELETE ENTIRE PARCEL:  
(2400.000 Acres) which is within the Sandhills Management Area. This Management Area is administratively closed to oil and gas leasing under the Casper RMP.**

**Delete the following:**

**T.0360N, R.0770W, 06th PM, WY**

**Sec. 013 N2;**  
**014 N2,SW;**  
**015 E2;**  
**022 E2;**  
**023**  
**N2N2,SWNW,NWSW,S2S2;**  
**023 NESE;**  
**024 NWNW,SW;**  
**027 E2;**

WY-204Q-0745 640.000 Acres  
T.0400N, R.0770W, 06th PM, WY  
Sec. 010 ALL;

Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY-204Q-0749 1296.880 Acres  
T.0390N, R.0770W, 06th PM, WY  
Sec. 030 LOTS 1-4;  
030 E2,E2W2;  
031 LOTS 1-4;  
031 E2,E2W2;

Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

WY-204Q-0750 879.610 Acres  
T.0360N, R.0770W, 06th PM, WY  
Sec. 004 LOTS 1-4;  
004 S2N2;  
006 LOTS 6;  
007 SESW,SE;  
034 E2;

Natrona And Converse Counties  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting Raptors.  
**DELETE PARTIAL PARCEL (320.000 Acres) which is within the Sandhills Management Area. This Management Area is administratively closed to oil and gas leasing under the Casper RMP.**  
**Delete the following:**  
**T.0360N, R.0770W, 06th PM, WY**  
**Sec. 034 E2;**

WY-204Q-0755 183.250 Acres  
T.0160N, R.0900W, 06th PM, WY  
Sec. 005 LOTS 11-16;

Carbon County  
Rawlins FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor

functionality pursuant to State of Wyoming Executive Order 2020-1.  
The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
CSU (1) Surface occupancy or use may be restricted or prohibited within the setting contributing to the National Register of Historic Places eligibility unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting historic and visual values of the Rawlins to Baggs Road.  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.  
CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting raptor nesting habitat.  
TLS (1) Feb 1 to July 31; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Raptors.  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting the habitats of identified amphibian/reptile species.  
CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting the Sand Hills ACEC unique vegetation complex.

WY-204Q-0757 1311.240 Acres  
T.0440N, R.0900W, 06th PM, WY  
Sec. 031 LOTS 5-8;  
031 E2,E2W2;

032 ALL;  
Washakie County  
Worland FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Lease Notice 1041  
Special Lease Notice: Unplugged wellbore(s) and/or other facilities are located on this parcel. For more information, please contact a Petroleum Engineer at the Worland Field Office at (307) 347-5100.  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHEMAWCA  
WY\_SW\_CSU\_PHMA  
NSO (1) as mapped on the Worland Field Office GIS database; (2) within 500 feet of perennial surface water, riparian/wetland areas, and playas  
TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.  
TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.  
TLS (1) No surface use is allowed within 1/4 mile of active raptor nests and 1/2 mile of active golden eagle, bald eagle, northern goshawk, merlin, and prairie and peregrine falcon nests and 1 mile of active ferruginous hawk nests during specific species nesting period or until young birds have fledged. This stipulation does not apply to operation and maintenance of production facilities. Timing Limitation Stipulation during the following time periods: American Kestrel Apr 1 to Aug 15, Bald Eagle Jan 1 to Aug 15, Boreal Owl Feb 1 to Jul 31, Burrowing Owl Apr 1 to Sept 15, Common Barn Owl Feb 1 – Sept 15, Cooper's Hawk Mar 15 to Aug 31, Eastern Screech-owl Mar 1 to Aug 15, Ferruginous Hawk Mar 15 to Jul 31, Golden Eagle Jan 15 to Jul 31, Great Gray Owl Mar 15 to Aug 31, Great Horned Owl Dec 1 to Sept 31, Long-eared Owl Feb 1 to Aug 15, Merlin Apr 1 to Aug 15, Northern Goshawk Apr 1 to Aug 15, Northern Harrier Apr 1 to Aug 15, Northern Pygmy-Owl Apr 1 to Aug 1, Northern Saw-whet Owl Mar 1 to Aug 31, Osprey Apr 1 to Aug 31, Peregrine Falcon Mar 1 to Aug 15, Prairie Falcon Mar 1 to Aug 15, Red-tailed Hawk Feb 1 to Aug 15, Sharp-shinned Hawk Mar 15 to Aug 31, Short-eared Owl Mar 15 to

Aug 1, Swainson's Hawk Apr 1 to Aug 31, Western Screech-owl Mar 1 to Aug 15, All other raptors Feb 1 to Jul 31, (2) as mapped on the Worland Field Office GIS database or as determined by field evaluation; (3) protecting active raptor nests.

CSU (1) Surface occupancy or use within 1/4 mile of raptor nest sites will be restricted. Prior to surface disturbance within 1/4 mile of raptor nests a mitigation plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM authorized officer has approved the plan or approved it with conditions. The plan must demonstrate to the BLM authorized officer's satisfaction that nesting raptors of conservation concern would not be agitated or bothered to a degree that causes or is likely to cause: physical injury; a decrease in productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior; or preclude nest reoccupation; (2) as mapped on the Worland Field Office GIS database, or determined by BLM field evaluation; (3) protecting raptor nest sites.

CSU (1) Prior to surface disturbance within 3-mile or the visual horizon of important cultural sites, whichever is closer, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-4) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM authorized officer, in consultation with appropriate Native American tribes and the SHPO, has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: There will be no adverse effects to NRHP eligible or listed historic properties; (2) as mapped on the Worland Field Office GIS database; (3) protecting cultural and scenic values of important cultural sites.

WY-204Q-0758 1280.000 Acres  
T.0390N, R.0780W, 06th PM, WY  
Sec. 014 E2, E2W2, SWNW, W2SW;  
015 NE, N2SE;  
023 E2, E2NW, NESW;  
Natrona County  
Casper FO

Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

WY-204Q-0759 520.000 Acres  
T.0130N, R.0910W, 06th PM, WY  
Sec. 029 N2, NWSW;  
031 NW;

Carbon County  
Rawlins FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
CSU (1) Surface occupancy or use may be restricted or prohibited within the setting contributing to the National Register of Historic Places eligibility unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins

Field Office GIS database; (3) protecting historic and visual values of the Rawlins to Baggs Road.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.

CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.

TLS (1) Feb 1 to July 31; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Raptors. CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting the habitats of identified amphibian/reptile species.

WY-204Q-0760 40.000 Acres  
T.0140N,R.0910W, 06th PM, WY

Sec. 033 SESE;

Carbon County

Rawlins FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.

CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database;

(3) protecting identified big game migration and transitional ranges.

TLS (1) Feb 1 to July 31; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting the habitats of identified amphibian/reptile species.

WY-204Q-0761 800.000 Acres  
T.0430N,R.0910W, 06th PM, WY

Sec. 001 S2S2;

T.0440N,R.0910W, 06th PM, WY

Sec. 035 ALL;

Hot Springs County

Worland FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

Lease Notice 1041

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

NSO (1) as mapped on the Worland Field Office GIS database; (2) within 500 feet of perennial surface water, riparian/wetland areas, and playas.

TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.

CSU (1) Prior to surface disturbance within 3-mile or the visual horizon of important cultural sites, whichever is closer, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-4) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM authorized officer, in consultation with appropriate Native American tribes and the SHPO, has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: There will be no adverse effects to NRHP eligible or listed historic properties; (2) as mapped on the Worland Field Office GIS database; (3) protecting cultural and scenic values of important cultural sites.

WY-204Q-0762 1550.190 Acres  
T.0460N,R.0910W, 06th PM, WY

Sec. 016 LOTS 2-5;

016 NESE,S2SE;

032 ALL;

033 ALL;

Washakie County

Worland FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

Lease Notice 1041

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.

TLS (1) No surface use is allowed within 1/4 mile of active raptor nests and 1/2 mile of active golden eagle, bald eagle, northern goshawk, merlin, and prairie and peregrine falcon nests and 1 mile of active ferruginous hawk nests during specific species nesting period or until young birds have fledged. This stipulation does not apply to operation and maintenance of production facilities. Timing Limitation Stipulation during the following time periods: American Kestrel Apr 1 to Aug 15, Bald Eagle Jan 1 to Aug 15, Boreal Owl Feb 1 to Jul 31, Burrowing Owl Apr 1 to Sept 15, Common Barn Owl Feb 1 – Sept 15, Cooper's Hawk Mar 15 to Aug 31, Eastern Screech-owl Mar 1 to Aug 15, Ferruginous Hawk Mar 15 to Jul 31, Golden Eagle Jan 15 to Jul 31, Great Gray Owl Mar 15 to Aug 31, Great Horned Owl Dec 1 to Sept 31, Long-eared Owl Feb 1 to Aug 15, Merlin Apr 1 to Aug 15, Northern Goshawk Apr 1 to Aug 15, Northern Harrier Apr 1 to Aug 15, Northern Pygmy-Owl Apr 1 to Aug 1, Northern Saw-whet Owl Mar 1 to Aug 31, Osprey Apr 1 to Aug 31, Peregrine Falcon Mar 1 to Aug 15, Prairie Falcon Mar 1 to Aug 15, Red-tailed Hawk Feb 1 to Aug 15, Sharp-shinned Hawk Mar 15 to Aug 31, Short-eared Owl Mar 15 to Aug 1, Swainson's Hawk Apr 1 to Aug 31, Western Screech-owl Mar 1 to Aug 15, All other raptors Feb 1 to Jul 31, (2) as mapped on the Worland Field Office GIS database or as determined by field evaluation; (3) protecting active raptor nests.

CSU (1) Surface occupancy or use within 1/4 mile of raptor nest sites will be restricted. Prior to surface disturbance within 1/4 mile of raptor nests a mitigation plan must be

submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM authorized officer has approved the plan or approved it with conditions. The plan must demonstrate to the BLM authorized officer's satisfaction that nesting raptors of conservation concern would not be agitated or bothered to a degree that causes or is likely to cause: physical injury; a decrease in productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior; or preclude nest reoccupation; (2) as mapped on the Worland Field Office GIS database, or determined by BLM field evaluation; (3) protecting raptor nest sites.

WY-204Q-0763 1003.860 Acres  
T.0460N, R.0910W, 06th PM, WY  
Sec. 018 LOTS 5,6;  
018 NENW;  
T.0460N, R.0920W, 06th PM, WY  
Sec. 013 LOTS 1-4;  
013 W2E2, N2SW;  
014 E2, NW;  
Washakie County  
Worland FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Lease Notice 1041  
Special Lease Notice: Unplugged wellbore(s) and/or other facilities are located on this parcel. For more information, please contact a Petroleum Engineer at the Worland Field Office at (307) 347-5100.  
WY\_SW\_TLS\_GHMAL  
NSO (1) as mapped on the Worland Field Office GIS database; (2) within 500 feet of perennial surface water, riparian/wetland areas, and playas.  
TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.  
CSU (1) Surface occupancy or use is restricted within 1/4 mile of water resources, public water supply wells and up to 10 miles upstream of public water supply intake areas. Prior to surface disturbance within 1/4 mile of water resources, public water supply wells and

up to 10 miles upstream of public water supply intake areas, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM authorized officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: Reserve pits are eliminated through the use of closed-loop drilling techniques, unless a pit is needed for critical safety reasons. Any necessary pits should be designed to prevent possible contamination of soil and groundwater. Evaporation ponds are not sited within this area. All oil and gas related infrastructure is set back a minimum of 500 feet from a public water supply well or intake area. Drill pad sites should be designed to disperse storm water runoff onto upland sites using proper erosion and sediment control techniques. Design drilling programs for water resource and public water supply protection. (2) as mapped by the WDEQ or Worland Field Office GIS database; (3) to protect water resources and public water supplies.

WY-204Q-0764 2560.000 Acres  
T.0460N, R.0910W, 06th PM, WY  
Sec. 020 ALL;  
021 ALL;  
028 ALL;  
029 ALL;  
Washakie County  
Worland FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Lease Notice 1041  
WY\_SW\_TLS\_GHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
NSO (1) as mapped on the Worland Field Office GIS database; (2) within 500 feet of perennial surface water, riparian/wetland areas, and playas.  
TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.  
TLS (1) No surface use is allowed within 1/4 mile of active raptor nests and 1/2 mile of active golden eagle, bald

eagle, northern goshawk, merlin, and prairie and peregrine falcon nests and 1 mile of active ferruginous hawk nests during specific species nesting period or until young birds have fledged. This stipulation does not apply to operation and maintenance of production facilities. Timing Limitation Stipulation during the following time periods: American Kestrel Apr 1 to Aug 15, Bald Eagle Jan 1 to Aug 15, Boreal Owl Feb 1 to Jul 31, Burrowing Owl Apr 1 to Sept 15, Common Barn Owl Feb 1 – Sept 15, Cooper's Hawk Mar 15 to Aug 31, Eastern Screech-owl Mar 1 to Aug 15, Ferruginous Hawk Mar 15 to Jul 31, Golden Eagle Jan 15 to Jul 31, Great Gray Owl Mar 15 to Aug 31, Great Horned Owl Dec 1 to Sept 31, Long-eared Owl Feb 1 to Aug 15, Merlin Apr 1 to Aug 15, Northern Harrier Apr 1 to Aug 15, Northern Pygmy-Owl Apr 1 to Aug 1, Northern Saw-whet Owl Mar 1 to Aug 31, Osprey Apr 1 to Aug 31, Peregrine Falcon Mar 1 to Aug 15, Prairie Falcon Mar 1 to Aug 15, Red-tailed Hawk Feb 1 to Aug 15, Sharp-shinned Hawk Mar 15 to Aug 31, Short-eared Owl Mar 15 to Aug 1, Swainson's Hawk Apr 1 to Aug 31, Western Screech-owl Mar 1 to Aug 15, All other raptors Feb 1 to Jul 31, (2) as mapped on the Worland Field Office GIS database or as determined by field evaluation; (3) protecting active raptor nests.

CSU (1) Surface occupancy or use within 1/4 mile of raptor nest sites will be restricted. Prior to surface disturbance within 1/4 mile of raptor nests a mitigation plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM authorized officer has approved the plan or approved it with conditions. The plan must demonstrate to the BLM authorized officer's satisfaction that nesting raptors of conservation concern would not be agitated or bothered to a degree that causes or is likely to cause: physical injury; a decrease in productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior; or preclude nest reoccupation; (2) as mapped on the Worland Field Office GIS database, or determined by BLM field evaluation; (3) protecting raptor nest sites.

WY-204Q-0765 1159.990 Acres  
T.0120N, R.0920W, 06th PM, WY

Sec. 001 LOTS 3,4;  
 001 SWNW;  
 002 LOTS 1-4;  
 002 S2N2,S2;  
 003 LOTS 1-4;  
 003 S2NE;  
 004 LOTS 1-4;  
 Carbon County  
 Rawlins FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.  
 CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.  
 TLS (1) Feb 1 to July 31; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Raptors.  
 CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting the habitats of identified amphibian/reptile species.

WY-204Q-0766 240.000 Acres  
 T.0130N,R.0920W, 06th PM, WY  
 Sec. 028 SW;  
 033 W2NW;  
 Carbon County  
 Rawlins FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1

Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.  
 CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.

WY-204Q-0767 265.120 Acres  
 T.0200N,R.1020W, 06th PM, WY  
 Sec. 004 LOTS 1,2;  
 004 SE;  
 010 NENE;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
 TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field

Office GIS database; (3) protecting nesting Raptors.

WY-204Q-0768 1560.000 Acres  
 T.0370N,R.0780W, 06th PM, WY  
 Sec. 011 S2SE;  
 014 NWNE,NW,SWSE;  
 023 N2NW,SENE,E2SW;  
 025 W2NE,E2;  
 026 ALL;  
 Natrona County  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_NSO\_PHMAL  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW-CSU\_PHMA

WY-204Q-0769 1520.000 Acres  
 T.0370N,R.0780W, 06th PM, WY  
 Sec. 028 ALL;  
 032 E2;  
 033 NE,N2NW,SWNW,SW;  
 033 N2SE,SESE;  
 Natrona County  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_NSO\_PHMAL  
 WY\_SW\_TLS\_GHMAL  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW-CSU\_PHMA

WY-204Q-0770 1880.000 Acres  
 T.0370N,R.0780W, 06th PM, WY  
 Sec. 010 ALL;  
 011 N2NW;  
 015 N2NW,E2SW;  
 022 E2W2,SESE;  
 027 N2NE,SENE,NWNW;  
 035 ALL;  
 Natrona County  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_NSO\_PHMAL  
 WY\_SW\_TLS\_GHMAL  
 WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

WY-204Q-0774 638.880 Acres  
T.0210N,R.1030W,06th PM, WY  
Sec. 002 LOTS 1-4;  
002 S2N2,S2;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
TLS (1) May 1 to June 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game parturition area.  
NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat.  
TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

WY-204Q-0775 2519.640 Acres  
T.0260N,R.1030W,06th PM, WY  
Sec. 001 LOTS 1-3;  
001 S2N2,S2;  
012 ALL;  
013 ALL;  
024 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1

Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting Class I and/or Class II Visual Resource Management Areas.  
NSO (1) surface occupancy or use within the South Pass Historic Landscape ACEC may be prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0776 2398.440 Acres  
T.0260N,R.1030W,06th PM, WY  
Sec. 002 LOTS 2-4;  
002  
SENE,SWNW,E2SW,SWSW;  
002 SE;  
011 ALL;  
014 ALL;  
023 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for

mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting Class I and/or Class II Visual Resource Management Areas.  
NSO (1) surface occupancy or use within the South Pass Historic Landscape ACEC may be prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0777 2540.970 Acres  
T.0260N,R.1030W,06th PM, WY  
Sec. 003 LOTS 1-4;  
003 S2N2,S2;  
004 LOTS 1-4;  
004 S2N2,S2;  
005 LOTS 1-4;  
005 S2N2,S2;  
006 LOTS 1-7;  
006 S2NE,SENE,E2SW,SE;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting Class I and/or Class II Visual Resource Management Areas.  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
NSO (1) surface occupancy or use within the South Pass Historic Landscape ACEC may be prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0778 2391.200 Acres  
T.0260N,R.1030W,06th PM, WY  
Sec. 007 LOTS 1-4;  
007 E2,E2W2;  
008 ALL;  
009 ALL;  
010 NWNE,SENE,NW,NWSW;  
010 SESW,SE;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting big  
game crucial winter range.

WY-204Q-0779 2240.160 Acres  
T.0210N,R.1020W,06th PM, WY  
Sec. 002 LOTS 1-4;  
002 S2N2,S2;  
004 LOTS 1-4;  
004 SW;  
010 ALL;  
012 N2,W2SW,N2SE;  
014 NWNE,N2NW,SWNW;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is  
located wholly or partially within a big  
game migration corridor designated by  
the State of Wyoming. The lessee or  
their designated operator will be  
required to work with the BLM and the  
State of Wyoming to take reasonable  
measures (see 43 CFR 3101.1-2) to  
maintain big game migration corridor  
functionality pursuant to State of  
Wyoming Executive Order 2020-1.  
The BLM will encourage the use of  
Master Development Plans for  
operations proposed on this lease parcel  
in accordance with Onshore Oil and Gas  
Order No. 1.  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting big  
game crucial winter range.

TLS (1) May 1 to June 30; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting big  
game parturition area.  
NSO (1) as mapped on the Rock  
Springs Field Office GIS database; (2)  
protecting raptor nesting habitat.  
TLS (1) Feb 1 to July 31; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting  
nesting Raptors.  
NSO (1) surface occupancy or use  
within the Natural Corral ACEC may  
be prohibited unless the operator and  
surface managing agency arrive at an  
acceptable plan for mitigation of  
anticipated impacts; (2) as mapped on  
the Rock Springs Field Office GIS  
database; (3) protecting cultural,  
historical, recreational and geological  
values.

WY-204Q-0781 2385.390 Acres  
T.0370N,R.0780W,06th PM, WY  
Sec. 004 LOTS 2-4;  
004 SWNE,S2NW,SW,W2SE;  
004 SESE;  
005 LOTS 1-4;  
005 S2NE,NESW,S2SW,SE;  
006 LOTS 1-3,6,7;  
006 S2NE,SENE,E2SW;  
008 NE,NWSE;  
009 N2,SE;  
017 S2SW;  
018 SESW,SE;

Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_GHMAL

WY-204Q-0788 2552.100 Acres  
T.0260N,R.1040W,06th PM, WY  
Sec. 001 LOTS 1-4;  
001 S2N2,S2;  
002 LOTS 1-4;  
002 LOTS S2N2,S2;  
003 LOTS 1-4;  
003 S2N2,S2;  
004 LOTS 1-4;  
004 S2N2,S2;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

Special Lease Notice: This parcel is  
located wholly or partially within a big  
game migration corridor designated by  
the State of Wyoming. The lessee or  
their designated operator will be  
required to work with the BLM and the  
State of Wyoming to take reasonable  
measures (see 43 CFR 3101.1-2) to  
maintain big game migration corridor  
functionality pursuant to State of  
Wyoming Executive Order 2020-1.  
The BLM will encourage the use of  
Master Development Plans for  
operations proposed on this lease parcel  
in accordance with Onshore Oil and Gas  
Order No. 1.  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting big  
game crucial winter range.  
NSO (1) surface occupancy or use  
within 1/4 mile or visual horizon of the  
trail, whichever is closer, may be  
restricted or prohibited unless the  
operator and surface managing agency  
arrive at an acceptable plan for  
mitigation of anticipated impacts; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting  
cultural and scenic values of the Oregon,  
California, Mormon Pioneer and Pony  
Express National Historic Trails.

WY-204Q-0790 640.000 Acres  
T.0260N,R.1030W,06th PM, WY

Sec. 033 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as  
mapped on the Rock Springs Field  
Office GIS database; (3) protecting big  
game crucial winter range.

WY-204Q-0791 1880.000 Acres  
T.0280N,R.1030W,06th PM, WY

Sec. 015 N2,SW,N2SE,SWSE;  
021 ALL;  
022 ALL;  
Sublette County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 WY\_SW\_NSO\_PHMAL  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 CSU (1) Surface occupancy or use will be restricted or prohibited to enhance recreation opportunities and protect areas with high recreation values; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting resource values in the Wind River Special Recreation Management Area West.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0792 638.880 Acres  
 T.0210N, R.1040W, 06th PM, WY  
 Sec. 002 LOTS 1-4;  
 002 S2N2,S2;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel

in accordance with Onshore Oil and Gas Order No. 1.  
 NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat.  
 TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

WY-204Q-0794 2560.000 Acres  
 T.0260N, R.1030W, 06th PM, WY  
 Sec. 025 ALL;  
 026 ALL;  
 034 ALL;  
 035 ALL;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting Class I and/or Class II Visual Resource Management Areas.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0795 2549.560 Acres  
 T.0380N, R.0780W, 06th PM, WY  
 Sec. 015 SWSW;  
 021 SWNW, W2SW, SESW;  
 022 W2NW, SENW, SW, W2SE;  
 025 S2SE;  
 027 SWNE;  
 028 W2, W2SE, SESE;  
 031 LOTS 1,3,4;

031 E2, NENW, SESW;  
 033 ALL;  
 034 W2NW, SENW, SW;  
 Natrona County  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
 TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-0798 2440.000 Acres  
 T.0260N, R.1040W, 06th PM, WY  
 Sec. 026  
 N2NE, NW, NWSW, S2SW, SE;  
 027 ALL;  
 028 ALL;  
 029 ALL;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field

Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0799 2560.000 Acres  
T.0260N, R.1040W, 06th PM, WY

Sec. 032 ALL;  
033 ALL;  
034 ALL;  
035 ALL;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3

Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0801 2477.960 Acres  
T.0260N, R.1050W, 06th PM, WY  
Sec. 001 LOTS 1-4;

001 S2N2,S2;  
012 ALL;  
013 ALL;  
014 E2, NENW,SW;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0803 2235.430 Acres  
T.0260N, R.1050W, 06th PM, WY  
Sec. 005 LOTS 1-4;

005 S2N2,S2;  
008 E2;  
009 ALL;  
010 ALL;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-0805 2560.000 Acres  
T.0260N, R.1050W, 06th PM, WY  
Sec. 023 ALL;

024 ALL;  
025 ALL;  
026 ALL;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0806 2526.500 Acres  
T.0260N, R.1040W, 06th PM, WY  
Sec. 005 LOTS 1-4;

005 S2N2,S2;  
006 LOTS 1-7;  
006 S2NE,SE,SE,SE,SE;  
007 LOTS 1-4;  
007 E2,E2W2;  
018 LOTS 1-4;  
018 E2,E2W2;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0807 2560.000 Acres  
T.0260N, R.1040W, 06th PM, WY  
Sec. 008 ALL;

009 ALL;  
010 ALL;  
011 ALL;

Sweetwater County  
Rock Springs FO

Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-0809 1120.000 Acres  
T.0260N, R.1040W, 06th PM, WY  
Sec. 017 ALL;  
025 S2NE, NENW, SWNW, S2;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor

functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

WY-204Q-0810 2531.280 Acres  
T.0260N, R.1040W, 06th PM, WY  
Sec. 019 LOTS 1-4;  
019 E2, E2W2;  
020 ALL;  
030 LOTS 1-4;  
030 E2, E2W2;  
031 LOTS 1-4;  
031 E2, E2W2;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0812 1079.530 Acres  
T.0260N, R.1060W, 06th PM, WY  
Sec. 030 LOTS 1-4;  
030 E2, E2W2;  
033 N2, N2SW, SWSW;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field

Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0813 2550.250 Acres  
T.0260N, R.1060W, 06th PM, WY  
Sec. 017 ALL;  
018 LOTS 1-4;  
018 E2, E2W2;  
019 LOTS 1-4;  
019 E2, E2W2;  
020 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat.  
TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.  
NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-0814 2535.230 Acres  
T.0260N, R.1070W, 06th PM, WY  
Sec. 005 LOTS 1-4;  
005 S2N2, S2;  
006 LOTS 1-7;  
006 S2NE, SENW, E2SW, SE;  
007 LOTS 1-4;  
007 E2, E2W2;  
008 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.  
NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-0815 2560.000 Acres  
T.0260N, R.1070W, 06th PM, WY  
Sec. 009 ALL;  
014 ALL;  
015 ALL;  
022 ALL;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-0816 2560.000 Acres  
T.0260N, R.1070W, 06th PM, WY  
Sec. 023 ALL;  
024 ALL;  
025 ALL;  
026 ALL;

Sweetwater County  
Rock Springs FO

Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-0817 2560.000 Acres  
T.0300N, R.1090W, 06th PM, WY  
Sec. 009 ALL;  
020 ALL;  
021 ALL;  
022 ALL;

Sublette County  
Pinedale FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
NSO (1) as mapped on the Pinedale Field Office GIS database; (2) protecting National Register eligible or listed cultural resource site 48SU3065.  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.  
CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.  
TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.  
TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.  
CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3)

protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.

CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 1,289.010 acres  
T.0300N, R.1090W, 06th PM, WY  
Sec. 020 ALL;**

**021 S2;  
022 S2;**

**Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-0819 1991.680 Acres  
T.0300N, R.1090W, 06th PM, WY  
Sec. 017 ALL;  
018 LOTS 1-4;  
018 E2, E2W2;  
019 LOTS 1-4;  
019 E2, E2W2;

Sublette County  
Pinedale FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
NSO (1) as mapped on the Pinedale Field Office GIS database; (2) protecting National Register eligible or listed

cultural resource sites 48SU4065 and 48SU6182.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.

CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.

CSU (1) Avoid white-tailed prairie dog

towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 1,353.602 acres**  
**T.0300N, R.1090W, 06th PM, WY**  
**Sec. 018 ALL;**  
**019 ALL;**  
**Unavailable for leasing Pinedale RMP 2008 page 2-22.**  
**Defer in part 638.078 acres**  
**T.0300N, R.1090W, 06th PM, WY**  
**Sec. 17 ALL;**  
**Tribal consultation required Pinedale RMP 2008 page 2-12.**

WY-204Q-0820 1823.480 Acres  
T.0300N, R.1100W, 06th PM, WY  
Sec. 001 LOTS 5-18;  
001 S2SE (EXCL 6.0 AC IN  
RSVR  
001 ROW WYE02438;  
002 LOTS 5-20;  
011 N2,N2SW,SWSW,NWSE;  
012 NWNE,NENW;  
012 NENE (EXCL 1.0 AC IN  
RSVR  
012 ROW WYE02438);  
Sublette County  
Pinedale FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
NSO (1) as mapped on the Pinedale Field Office GIS database; (2) buffering No Lease areas.  
CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.  
CSU (1) Surface occupancy or use within 1/4 mile or visual horizon of trail whichever is closer may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting cultural and scenic values of the Lander Trail.  
NSO (1) as mapped on the Pinedale Field Office GIS database; (2) Protecting

contributing segments of the Lander Trail and the adjacent 1/4 mile area.

CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.

CSU (1) Surface occupancy or use within livestock trailing corridors (stock driveways) will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting cattle movement along the Green River Drift stock driveway (48SU7311/48SU7312).

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting

mountain plover.

CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 990.782 acres**

**T.0300N, R.1100W, 06th PM, WY**

**Sec. 001 LOTS 5-16;**

**002 LOTS 5-7, 10-15, 18-20;**

**011 NENW, NWNE;**

**Unavailable for leasing Pinedale RMP 2008 page 2-22.**

WY-204Q-0821 1841.090 Acres

T.0300N, R.1100W, 06th PM, WY

Sec. 003 LOTS 3,11-14;

004 LOTS 3,4;

004 S2NW,SW,W2SE;

005 LOTS 1-4;

005 S2N2,S2;

006 LOTS 1-7;

006 S2NE,SENE,E2SW,SE;

Sublette County

Pinedale FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

WY\_SW\_NSO\_PHMAL

WY\_SW\_TLS\_GHMAL

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

NSO (1) as mapped on the Pinedale Field Office GIS database; (2) buffering No Lease areas.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office

GIS database; (3) protecting Class I and II Visual Resource Management Areas.

CSU (1) Surface occupancy or use within 1/4 mile or visual horizon of trail whichever is closer may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting cultural and scenic values of the Lander Trail.

NSO (1) as mapped on the Pinedale Field Office GIS database; (2) Protecting contributing segments of the Lander Trail and the adjacent 1/4 mile area.

CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.

CSU (1) Surface occupancy or use within livestock trailing corridors (stock driveways) will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting cattle movement along the Green River Drift stock driveway (48SU7311/48SU7312).

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Big game migration routes will be protected. Known big game migration bottleneck areas are available for oil and gas leasing with NSO restrictions, unless other protection is provided; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the

Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.

CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 1,297.502 acres**  
**T.0300N, R.1100W, 06th PM, WY**

**Sec. 004 NWSW, SWSW;**

**005 LOTS 1-3, 5-7;**

**005 S2N2,S2;**

**006 LOTS 1-7;**

**006 S2NE,SENE,E2SW,SE;**

**Unavailable for leasing Pinedale RMP 2008 page 2-22.**

WY-204Q-0823 2185.190 Acres

T.0300N, R.1100W, 06th PM, WY

Sec. 010 NENE;

013 LOTS 1;

013 NE,NENW,S2NW,S2;

014 LOTS 7;

014 NWNW,SESW,SE;

017 ALL;

018 LOTS 1-4;

018 E2,E2W2;

Sublette County

Pinedale FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

~~WY\_SW\_NSO\_PHMAL~~

WY\_SW\_TLS\_GHMAL

NSO (1) as mapped on the Pinedale Field Office GIS database; (2) buffering No Lease areas.

NSO (1) as mapped on the Pinedale Field Office GIS database; (2) protecting National Register eligible or listed

cultural resource site 48SU1789 and 48SU7036.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.

CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.

CSU (1) Surface occupancy or use within livestock trailing corridors (stock driveways) will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting cattle movement along the Green River Drift stock driveway (48SU7311/48SU7312).

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting

habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.

CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 1,543.711 acres  
T.0300N, R.1100W, 06th PM, WY**

**Sec. 013 LOTS 1;**

**013 NE,NENW,S2NW,S2;**

**014 LOTS 7;**

**014 NWNW,SESSE,SE;**

**017 NW;**

**018 LOTS 1-4;**

**018 E2,NE,N2SE;**

**Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-0824 541.390 Acres

T.0300N, R.1100W, 06th PM, WY

Sec. 019 LOTS 1-4;

019 N2NE, E2W2;

020 N2NE;

021 N2NW;

Sublette County

Pinedale FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_GHMA

NSO (1) as mapped on the Pinedale Field Office GIS database; (2) buffering No Lease areas.

NSO (1) as mapped on the Pinedale Field Office GIS database; (2) protecting National Register eligible or listed cultural resource site 48SU301, 48SU1755, and 48SU1820.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.

CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the

Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.

CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 38.241 acres**

**T.0300N, R.1100W, 06th PM, WY**

**Sec. 019 LOT 1;**

**Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

**Defer in part 227.808 acres**

**T.0300N, R.1100W, 06th PM, WY**

**Sec. 019 LOTS 2,3;**

**019 NWNE, E2NW, NESW;**

**Tribal consultation required Pinedale RMP 2008 page 2-12.**

WY-204Q-0825 2520.000 Acres  
T.0300N,R.1100W, 06th PM, WY

Sec. 022 SESE;  
023 NE,E2NW,S2;  
024 ALL;  
025 ALL;  
026 ALL;

Sublette County  
Pinedale FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

**Delete in full 2,520,000 acres  
Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-0827 560.000 Acres  
T.0300N,R.1100W, 06th PM, WY  
Sec. 032 N2,E2SW,SE;

Sublette County  
Pinedale FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

**Delete in full 560,000 acres  
Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-0828 1920.000 Acres  
T.0300N,R.1100W, 06th PM, WY  
Sec. 033 ALL;

034 ALL;  
035 ALL;

Sublette County  
Pinedale FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

**Delete in full 1,920,000 acres  
Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-0829 622.720 Acres  
T.0400N,R.0780W, 06th PM, WY

Sec. 006 LOTS 1-7;  
006 S2NE,SENE,E2SW,SE;

Natrona County  
Casper FO

Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_GHMAL  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-0830 2124.810 Acres  
T.0400N,R.0780W, 06th PM, WY

Sec. 001 LOTS 1-4;  
001 S2N2,S2;  
002 LOTS 1-4;  
002 S2N2,S2;  
011 N2,NWSW,S2S2,NESE;  
012 S2;

Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY-204Q-0831 2477.960 Acres  
T.0390N,R.0780W, 06th PM, WY

Sec. 015 NENW,S2NW,SW,S2SE;  
022 N2N2,SENE,N2SE,SESE;  
023 NWNW;  
024 ALL;  
025 ALL;  
030 LOTS 2-4;  
030 W2NE,SENE,E2SW,SE;

Natrona County  
Casper FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as

mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-0835 1240.000 Acres  
T.0400N,R.0780W, 06th PM, WY  
Sec. 033 N2,NESW,S2SW,SE;

034 ALL;

Natrona County  
Casper FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors

WY-204Q-0836 1039.830 Acres  
T.0390N,R.0780W, 06th PM, WY

Sec. 029 SWSW;  
031 LOTS 1-3;  
031 NE,E2NW,NESE,S2SE;  
032 SWNE,NW,NESW,S2SW,

SE;

033 SWSW;

Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1

Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

WY-204Q-6224 960.000 Acres  
 T.0140N,R.0920W, 06th PM, WY  
 Sec. 024 ALL;  
 025 E2;

Carbon County  
 Rawlins FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_GHMAL  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.  
 CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.  
 CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting raptor nesting habitat.  
 TLS (1) Feb 1 to July 31; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Raptors.

TLS (1) April 10 to July 10 (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Mountain plover.

WY-204Q-6732 2120.000 Acres  
 T.0130N,R.0910W, 06th PM, WY  
 Sec. 009 W2,NESE;  
 011 SWSE;  
 011  
 NE,N2NW,SESW,SW,N2SE;  
 013 NWNE,SESW,SW;  
 014 W2E2,W2,E2SE;  
 015

NE,SWNW,W2SW,SESW,E2SE;  
 Carbon County  
 Rawlins FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.  
 CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.  
 CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting raptor nesting habitat.  
 TLS (1) Feb 1 to July 31; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting nesting Raptors.  
 CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS

database; (3) protecting the habitats of identified amphibian/reptile species.

WY-204Q-6879 605.680 Acres  
 T.0330N,R.1100W, 06th PM, WY  
 Sec. 014 LOTS 4,5,12;  
 023 LOTS 5,12,13;  
 026 LOTS 4,5,12,13;  
 035 LOTS 4,5,12-14;

Sublette County  
 Pinedale FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 NSO (1) as mapped on the Pinedale Field Office GIS database; (2) buffering  
 No Lease areas.  
 CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.  
 CSU (1) Surface occupancy or use within livestock trailing corridors (stock driveways) will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting cattle movement along the Green River Drift stock driveway (48SU7311/48SU7312).  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.  
 TLS (1) Big game migration routes will be protected. Known big game migration bottleneck areas are available for oil and gas leasing with NSO restrictions, unless

other protection is provided; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

WY-204Q-6894 80.000 Acres  
T.0410N, R.0630W, 06th PM, WY  
Sec. 006 N2SE;

Weston County  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 1153  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-02 (Sec. 6: portions N2SE)  
TBNG2002-CSU-03 (Sec. 6: N2SE)  
TBNG2002-CSU-06 (Sec. 6: N2SE)

WY-204Q-6895 1561.400 Acres  
T.0410N, R.0630W, 06th PM, WY  
Sec. 011 W2;  
012 NWSE;

017 W2;  
018 LOTS 1-4;  
018 E2,E2W2;  
031 E2SW,W2SE;  
032 E2SW;  
Weston And Niobrara Counties  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 1137  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-02 (Sec. 11: portions of E2NW,N2SW; Sec. 17: portions of N2SW,SESW; Sec. 18: portions of Lots 1,3; Sec. 18: portions of NWNE,E2W2, S2SE; Sec. 31: portions of E2SW,W2SE; Sec. 32: portions of E2SW)  
TBNG2002-TL-01 (Sec. 18: portions of Lots 1-4)  
TBNG2002-CSU-03 (Sec. 11: W2; Sec. 12: NWSE; Sec. 17: W2; Sec. 18: Lots 1-4;  
Sec. 18: E2,E2W2; Sec. 31: E2SW,W2SE; Sec. 32: E2SW)  
TBNG2002-CSU-06 (Sec. 17: W2; Sec. 18: Lots 1-4; Sec. 18: E2,E2W2)

WY-204Q-6899 640.000 Acres  
T.0410N, R.0630W, 06th PM, WY  
Sec. 019 S2NE E2SW,SE;

020 E2;  
Weston County  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 0410N-0630W-003  
WYOMING ACQUIRED  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-02 (Sec. 19: portions of SWNE,SESW,NESE;  
Sec. 20: portions of SENE,N2SE,SWSE)  
TBNG2002-CSU-03 (Sec. 19: S2NE,E2SW,SE; Sec. 20: E2)  
TBNG2002-CSU-06 (Sec. 19: S2NE,E2SW,SE; Sec. 20: E2)

WY-204Q-6901 120.000 Acres  
T.0420N, R.0630W, 06th PM, WY  
Sec. 029 SWNE;

034 E2SE;  
Weston County  
Newcastle FO  
Formerly Lease No.

THUNDER BASIN NG - 1139  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-06 (Sec. 34: portions of SESE)  
TBNG2002-TL-01 (Sec. 34: SESE; portions of NESE)  
TBNG2002-CSU-03 (Sec. 29: SWNE; Sec. 34: E2SE)  
WY-204Q-6905 120.000 Acres  
T.0410N, R.0640W, 06th PM, WY  
Sec. 017 SWSE;  
020 NWNE;  
030 NESW;  
Weston And Niobrara Counties  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 0410N-0640W-0001  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-02 (Sec. 30: portions of NESW)  
TBNG2002-TL-01 (Sec. 17: portions of SWSE)  
TBNG2002-CSU-03 (Sec. 17: SWSE; Sec. 20: NWNE; Sec. 30: NESW)

WY-204Q-6906 120.000 Acres  
T.0410N, R.0650W, 06th PM, WY  
Sec. 024 E2NE,SESE;  
Weston County  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 0410N-0650W-001  
WYOMING ACQUIRED  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-03 (Sec. 24: SENE; portions of NENE,SESE)  
TBNG2002-TL-06 (Sec. 24: SENE; portions of NENE,SESE)  
TBNG2002-CSU-01 (Sec. 24: portions of SESE)  
TBNG2002-CSU-03 (Sec. 24: E2NE,SESE)

TBNG2002-CSU-05 (Sec. 24: portions of SENE)

WY-204Q-6907 635.880 Acres  
T.0370N,R.0610W, 06th PM, WY  
Sec. 003 LOTS 1-4;  
003 S2N2,S2;

Niobrara County  
Newcastle FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_GHMAL

TLS (1) Mar 15 to Jun 30; (2) as mapped on the Newcastle Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats outside designated Priority Habitat Management Areas (Core and Connectivity), within 2 miles of an occupied lek.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Newcastle Field Office GIS database; (3) protecting nesting raptors.  
CSU (1) Surface occupancy or use may be restricted or prohibited if paleontological sites exist unless paleontological sites are avoided or the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) entire lease; (3) protecting Lance Creek Formation paleontological values.

WY-204Q-6908 2482.030 Acres  
T.0410N,R.0630W, 06th PM, WY  
Sec. 002 LOTS 3,4;

002 SWNW,SW;  
004 LOTS 3,4;  
005 LOTS 1-4;  
005 S2N2,S2;  
006 LOTS 6,7;  
006 E2W2,S2SE;  
007 LOTS 1,2;  
007 NE,E2NW;  
008 W2,SE;  
009 S2NE,S2;

Weston County  
Newcastle FO

Formerly Lease No.

THUNDER BASIN NG - 1136

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_NFO\_CSU\_PHMAC

TBNG-R2-FS-2820-13 Lease Notice

TBNG2002-NSO-02 (Sec. 2: portions of E2SW; Sec. 5: portions of SE;  
Sec. 6: portions of Lots 6,7; Sec. 6: portions of SESW,SESE;  
Sec. 7: portions of Lots 1,2; Sec. 7: portions of NENE,E2NW;  
Sec. 8: portions of W2,SE; Sec. 9: portions of S2NE,SWSW,NESE,S2SE)  
TBNG2002-NSO-06 (Sec. 2: portions of Lots 3,4; Sec. 9: portions of SWNE,N2SW,NWSE)  
TBNG2002-TL-01 (Sec. 2: Lots 3,4; Sec. 2: portions of S2NW; Sec. 8: portions of NESE; Sec. 9: SWNE,NESW,NWSE; portions of SENE,W2SW,SESW, NESE,S2SE)  
TBNG2002-CSU-03 (Sec. 2: Lots 3,4; Sec. 2: S2NW,SW; Sec. 4: Lots 3,4; Sec. 5: Lots 1-4; Sec. 5: S2N2,S2; Sec. 6: Lots 6,7; Sec. 6: E2SW,S2SE; Sec. 7: Lots 1,2; Sec. 7: NE,E2NW; Sec. 8: W2,SE; Sec. 9: S2NE,S2)  
TBNG2002-CSU-06 (Sec. 4: Lots 3,4; Sec. 5: Lots 1-4; Sec. 5: S2N2,S2; Sec. 6: Lots 6,7; Sec. 6: E2SW,S2SE; Sec. 7: Lots 1,2; Sec. 7: NE,E2NW; Sec. 8: W2,SE; Sec. 9: S2NE,S2)

WY-204Q-6909 320.000 Acres  
T.0420N,R.0630W, 06th PM, WY  
Sec. 010 N2;

Weston County

Newcastle FO

Formerly Lease No.

THUNDER BASIN NG - 1102

WYOMING ACQUIRED

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_NFO\_TLS\_PHMAC

WY\_NFO\_CSU\_PHMAC

TBNG-R2-FS-2820-13 Lease Notice

TBNG2002-NSO-02 (Sec. 10: portions of N2N2)

TBNG2002-NSO-06 (Sec. 10: portions of NWNW)

TBNG2002-TL-01 (Sec. 10: NWNW; portions of NENW,SWNW)

TBNG2002-CSU-03 (Sec. 10: N2)

WY-204Q-6910 40.000 Acres  
T.0430N,R.0630W, 06th PM, WY  
Sec. 006 SESW;

Weston County

Newcastle FO

Formerly Lease No.

THUNDER BASIN NG - 715

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-CSU-03 (Sec. 6: SESW)

WY-204Q-6911 639.650 Acres  
T.0410N,R.0640W, 06th PM, WY  
Sec. 007 LOTS 4;

008 W2SW;  
009 NWNE;  
017 N2NW;  
018 SESW;  
019 SWNE,E2NW;  
030 NENW,SESW,SE;

Weston County

Newcastle FO

Formerly Lease No.

THUNDER BASIN NG - 749

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_NFO\_CSU\_PHMAC

TBNG-R2-FS-2820-13 Lease Notice

TBNG2002-NSO-01 (Sec. 9: portions of

NWNE; Sec. 19: portions of

SWNE,NENW; Sec. 30: portions of SESW,SWSE)

TBNG2002-NSO-02 (Sec. 7: portions of

Lot 4; Sec. 8: portions of W2SW;

Sec. 9: portions of NWNE; Sec. 17:

portions of N2NW; Sec. 18: portions of

SESW; Sec. 19: portions of

SWNE,E2NW; Sec. 30: portions of

SESW,SWSE)

TBNG2002-NSO-03 (Sec. 18: portions

of SESW; Sec. 19: SWNE,E2NW; Sec.

30: portions of NENW,N2SE,SESE)

TBNG2002-NSO-06 (Sec. 7: portions of

Lot 4; Sec. 19: portions of SWNE)

TBNG2002-TL-01 (Sec. 7: Lot 4; Sec.

17: portions of NWNW; Sec. 18:

portions of SESW)

TBNG2002-TL-06 (Sec. 18: portions of

SESW; Sec. 19: SWNE,E2NW; Sec. 30:

portions of NENW,N2SE,SESE)

TBNG2002-CSU-01 (Sec. 30: portions

of NENW)

TBNG2002-CSU-03 (Sec. 7: Lot 4; Sec.

8: W2SW; Sec. 9: NWNE;

Sec 17: N2NW; Sec. 18: SESW; Sec.

19: SWNE,E2NW; Sec. 30:

NENW,SESW,SE)

TBNG2002-CSU-05 (Sec. 19: portions

of SWNE,E2NW; Sec. 30: portions of

NESE)

WY-204Q-6912 800.000 Acres  
T.0430N,R.0640W, 06th PM, WY  
Sec. 003 S2NW,N2SW;

004 S2NE,N2SE;  
008 S2NE;  
009 SWNW,SW,S2SE;  
010 N2NW,SWNW;

Weston County

Newcastle FO

Formerly Lease No.  
THUNDER BASIN NG - 670  
WYOMING ACQUIRED  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-06 Sec. 4: portions of  
SWNE,NWSE; Sec. 9: NESW, portions  
of SWNW,NWSW,SESW,SWSE; Sec.  
10: portions of SWNW)  
TBNG2002-TL-01 (Sec. 4: NWSE,  
portions of S2NE,NESE; Sec. 8:  
portions of SENE; Sec. 9:  
SWNW,N2SW,SESW, portions of  
SWSW,S2SE; Sec. 10: W2NW,  
portions of NENW)  
TBNG2002-CSU-03 (Sec. 3:  
S2NW,N2SW; Sec. 4: S2NE,N2SE; Sec.  
8: S2NE;  
Sec. 9: SWNW,SW,S2SE; Sec. 10:  
N2NW,SWNW)

WY-204Q-6913 160.000 Acres  
T.0430N,R.0640W, 06th PM, WY  
Sec. 024 E2E2;

Weston County  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 1059  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC  
TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-NSO-01 (Sec. 24: portions  
of E2SE)  
TBNG2002-NSO-02 (Sec. 24: portions  
of E2E2)  
TBNG2002-CSU-03 (Sec. 24: E2E2)

WY-204Q-6914 280.000 Acres  
T.0420N,R.0650W, 06th PM, WY  
Sec. 021 NENE;  
023 E2NW;  
026 NW;

Weston County  
Newcastle FO  
Formerly Lease No.  
THUNDER BASIN NG - 671  
WYOMING ACQUIRED  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_NFO\_CSU\_PHMAC

TBNG-R2-FS-2820-13 Lease Notice  
TBNG2002-TL-01 (Sec. 26: portions of  
SWNW)  
TBNG2002-TL-02 (Sec. 26: portions of  
SESW)  
TBNG2002-CSU-03 (Sec. 21: NENE;  
Sec. 23: W2NW; Sec. 26: NW)

WY-204Q-6915 861.900 Acres  
T.0390N,R.0670W, 06th PM, WY  
Sec. 007 LOTS 1-4;  
007 E2,E2W2;  
017 E2NW;  
019 LOTS 1,2;  
019 E2NW;

Converse County  
Casper FO  
Formerly Lease No.  
THUNDER BASIN NG - 917  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
TBNG-R2-FS-2820-13  
TBNG2002-NSO-01 (Sec. 7: portions of  
Lots 1,2,4; Sec. 7: portions of  
E2NW,SESW,W2SE,SESE; Sec. 17:  
portions of E2NW; Sec. 19: portions of  
Lots 1,2; Sec. 19: portions of NENW;)  
TBNG2002-NSO-02 (Sec. 7: portions of  
Lots 1,2,4; Sec. 7: portions of  
NENE,S2NE,E2W2,E2; Sec. 17:  
portions of E2NW; Sec. 19: portions of  
Lots 1,2; Sec. 19: portions of E2NW;)  
TBNG2002-NSO-05 (Sec. 7: portions of  
Lot 4; Sec. 17: portions of E2NW; Sec.  
19: Lots 1,2; Sec. 19: E2NW;)  
TBNG2002-NSO-06 (Sec. 19: portions  
of NENW;)  
TBNG2002-TL-02 (Sec. 19: portions of  
Lots 1,2; Sec. 19: NENW; portions of  
SESW;)  
TBNG2002-CSU-03 (Sec. 7: Lots 1-4;  
Sec. 7: E2,E2W2; Sec. 17: E2NW;  
Sec. 19: Lots 1,2; Sec. 19: E2NW;)  
TBNG2002-CSU-07 (Sec. 7: portions of  
Lots 1,2; Sec. 7: portions of E2NW,  
SESW, S2SE; Sec. 17: portions of  
SESW; Sec. 19: portions of Lot 1;)  
TBNG2002-LN-01 (Sec. 7: Lots 1-4;  
Sec. 7: E2,E2W2; Sec. 17: E2NW; Sec.  
19: Lots 1,2; Sec. 19: E2NW;)  
NSO (1) as mapped on the Casper Field  
Office GIS database (2) protecting the  
(Miller Hills) Eagle Roost.

WY-204Q-6916 1396.610 Acres  
T.0430N,R.0690W, 06th PM, WY  
Sec. 020 LOTS 8,9,14,15;  
021 LOTS 1-16;  
022 LOTS 1-8;  
028 LOTS 2-7;

Campbell County  
Buffalo FO  
Formerly Lease No.  
THUNDER BASIN NG - 1012  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
TBNG-R2-FS-2820-13  
TBNG2002-NSO-01 (Sec. 20: portions  
of Lots 9,14,15, Sec. 21: portions of  
Lots 2,3,6,7,10,11,14-16, Sec. 22:  
portions of Lots 1-4,6-8, Sec. 28:  
portions of Lot 2)  
TBNG2002-NSO-02 (Sec. 20: portions  
of Lots 8,9,14,15, Sec. 21: portions of  
Lots 1-8,10-16, Sec. 22: portions of  
Lots 1-8, Sec. 28: portions of Lots  
2,3,7)  
TBNG2002-TL-01 (Sec. 22: portions of  
Lots 1-4)  
TBNG2002-TL-02 (Sec. 21: portions of  
Lots 3,4, Sec. 28: portions of Lot 7)  
TBNG2002-CSU-03 (all)  
TBNG2002-CSU-07 (Sec. 20: portions  
of Lots 9,14,15, Sec. 21: portions of  
Lots 1-3,6,7,10,11,13-16, Sec. 22: Lots  
1,2,6, portions of Lots 3-5,7,8, Sec. 28:  
Lots 4-7, portions of Lots 2,3)  
TBNG2002-LN-01 (Sec. 22: Lots 1,2,7,  
portions of Lots 3,6,8)

WY-204Q-6917 300.520 Acres  
T.0400N,R.0760W, 06th PM, WY  
Sec. 031 LOTS 1-4;  
031 E2W2;

Converse County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY-204Q-6918 2299.040 Acres  
T.0400N,R.0770W, 06th PM, WY  
Sec. 029 ALL;  
031 LOTS 1-4;  
031 E2,E2W2;  
032 N2,SW,N2SE,SWSE;  
033 E2E2,NW,N2SW;

Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-6919 2123.490 Acres  
T.0380N, R.0770W, 06th PM, WY

Sec. 003 LOTS 1-4;

003 S2N2, S2;

004 LOTS 1-4;

004 S2N2, E2SE;

008 S2NW;

009 NWN, N2NW, S2S2, NESE;

015

N2SWNW, E2SE, SWNENW;

017 E2SE;

021 SENENE;

022 NENENE, SWNWNW;

032 SE;

033

E2NE, NWN, SWNW, W2SW;

033 SESW, NESE, SWSE;

Natrona County

Casper FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only). TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-

grouse that attend leks within designated PHMAs (Core only).

CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-grouse designated PHMAs (Core only).

The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-6924 720.000 Acres

T.0380N, R.0770W, 06th PM, WY

Sec. 027 SWSE, NESE;

027 NE, N2NW, W2SW, SESW;

028 N2NE, S2SE;

034 NWN, N2NW;

Natrona County

Casper FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail. CSU (1) Surface occupancy or use within 3 miles or visual horizon of the

historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail. TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only). TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-grouse that attend leks within designated PHMAs (Core only).

CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-grouse designated PHMAs (Core only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-6925 1976.320 Acres

T.0390N, R.0770W, 06th PM, WY

Sec. 003 LOTS 1-4;

003 S2N2, S2;

004 LOTS 1-4;

004 S2N2, S2;

010 NWSW;

018 LOTS 1-4;  
018 E2W2,E2;  
Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
NSO (1) as mapped on the Casper Field Office GIS database (2) protecting the (Pine Ridge) Eagle Roost.

WY-204Q-6927 2157.350 Acres  
T.0390N,R.0780W, 06th PM, WY  
Sec. 002 S2;  
003 LOTS 1-4;  
003 S2N2,S2;  
004 LOTS 1,4;  
004 E2SW,SE;  
009 NE,N2SE;  
010 NE,N2NW,SE,NW,N2SE;  
010 SWSE;  
012 W2NW,SESE;  
013 SENE,E2SE;  
Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

WY-204Q-6928 1563.470 Acres  
T.0370N,R.0780W, 06th PM, WY  
Sec. 001 LOTS 1-4;  
001 S2N2;  
002 LOTS 1-4;  
002 S2N2,SW;  
003 LOTS 1-4;  
003 S2N2,S2;  
004 LOTS 1;  
004 SENE,NESE;  
Natrona County  
Casper FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_TLS\_GHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.  
TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only).  
TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-grouse that attend leks within designated PHMAs (Core only).  
CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss.  
This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil

and natural gas within Greater Sage-grouse designated PHMAs (Core only).  
The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

WY-204Q-6931 707.920 Acres  
T.0430N,R.0900W, 06th PM, WY  
Sec. 005 LOTS 5-8;  
005 S2N2,S2;  
006 SENW;  
Washakie County  
Worland FO  
Formerly Lease No.  
Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Lease Notice 1041  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
NSO (1) as mapped on the Worland Field Office GIS database; (2) within 500 feet of perennial surface water, riparian/wetland areas, and playas.  
TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.  
TLS (1) No surface use is allowed within 1/4 mile of active raptor nests and 1/2 mile of active golden eagle, bald eagle, northern goshawk, merlin, and prairie and peregrine falcon nests and 1 mile of active ferruginous hawk nests during specific species nesting period or until young birds have fledged. This stipulation does not apply to operation and maintenance of production facilities.  
Timing Limitation Stipulation during the following time periods: American Kestrel Apr 1 to Aug 15, Bald Eagle Jan 1 to Aug 15, Boreal Owl Feb 1 to Jul 31, Burrowing Owl Apr 1 to Sept 15, Common Barn Owl Feb 1 – Sept 15, Cooper's Hawk Mar 15 to Aug 31, Eastern Screech-owl Mar 1 to Aug 15, Ferruginous Hawk Mar 15 to Jul 31, Golden Eagle Jan 15 to Jul 31, Great Gray Owl Mar 15 to Aug 31, Great Horned Owl Dec 1 to Sept 31, Long-eared Owl Feb 1 to Aug 15, Merlin Apr

1 to Aug 15, Northern Goshawk Apr 1 to Aug 15, Northern Harrier Apr 1 to Aug 15, Northern Pygmy-Owl Apr 1 to Aug 1, Northern Saw-whet Owl Mar 1 to Aug 31, Osprey Apr 1 to Aug 31, Peregrine Falcon Mar 1 to Aug 15, Prairie Falcon Mar 1 to Aug 15, Red-tailed Hawk Feb 1 to Aug 15, Sharp-shinned Hawk Mar 15 to Aug 31, Short-eared Owl Mar 15 to Aug 1, Swainson's Hawk Apr 1 to Aug 31, Western Screech-owl Mar 1 to Aug 15, All other raptors Feb 1 to Jul 31, (2) as mapped on the Worland Field Office GIS database or as determined by field evaluation; (3) protecting active raptor nests.

CSU (1) Surface occupancy or use within 1/4 mile of raptor nest sites will be restricted. Prior to surface disturbance within 1/4 mile of raptor nests a mitigation plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM authorized officer has approved the plan or approved it with conditions. The plan must demonstrate to the BLM authorized officer's satisfaction that nesting raptors of conservation concern would not be agitated or bothered to a degree that causes or is likely to cause: physical injury; a decrease in productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior; or preclude nest reoccupation; (2) as mapped on the Worland Field Office GIS database, or determined by BLM field evaluation; (3) protecting raptor nest sites.

CSU (1) Prior to surface disturbance within 3-mile or the visual horizon of important cultural sites, whichever is closer, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-4) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM authorized officer, in consultation with appropriate Native American tribes and the SHPO, has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM authorized officer's satisfaction how the operator will meet the following performance standards: There will be no adverse effects to NRHP eligible or listed historic properties; (2) as mapped on the Worland Field Office GIS database; (3) protecting cultural and scenic values of important cultural sites.

WY-204Q-6932 680.000 Acres  
T.0130N,R.0910W, 06th PM, WY  
Sec. 021 ALL;  
022 NWNW;

Carbon County  
Rawlins FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1.

The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

CSU (1) Surface occupancy or use may be restricted or prohibited within the setting contributing to the National Register of Historic Places eligibility unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting historic and visual values of the Rawlins to Baggs Road

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting big game crucial winter range.

CSU (1) Surface occupancy or use will be restricted unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting identified big game migration and transitional ranges.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rawlins Field Office GIS database; (3) protecting the habitats of identified amphibian/reptile species.

WY-204Q-6933 426.160 Acres

T.0460N,R.0920W, 06th PM, WY  
Sec. 001 LOTS 5,7-9;

001 SWNW;  
011 E2SW,S2SE;  
012 NWNW;

Washakie County  
Worland FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
Lease Notice 1041

NSO (1) as mapped on the Worland Field Office GIS database; (2) within 500 feet of perennial surface water, riparian/wetland areas, and playas.  
TLS (1) No surface use is allowed during the following time periods (TLS) Nov 15 to Apr 30; (2) as mapped on the Worland Field Office GIS database (3) protecting big game on crucial winter range.

WY-204Q-6934 951.370 Acres  
T.0370N,R.0780W, 06th PM, WY  
Sec. 001 NESE;

002 SE;  
011 N2NE,SWNE,S2NW,SW;  
011 NWSE;  
018 LOTS 3,4;  
019 LOTS 1,2;  
021 SWSW;  
032 E2W2;

Natrona County  
Casper FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3  
WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA  
TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-6935 200.000 Acres  
T.0230N,R.1020W, 06th PM, WY  
Sec. 014 SENE,SE;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting Class I and/or Class II Visual Resource Management Areas.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-6936 480.000 Acres  
T.0230N,R.1020W, 06th PM, WY  
Sec. 032 S2N2,S2;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field

Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-6937 2350.980 Acres  
T.0260N,R.1030W, 06th PM, WY  
Sec. 015 E2,NENW,S2NW,SW;  
017 N2NE,NW,NWSW,SESW;  
017 SE;  
018 LOTS 1-4;  
018 E2,E2W2;  
022 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

WY-204Q-6938 2348.250 Acres  
T.0260N,R.1030W, 06th PM, WY  
Sec. 019 LOTS 1-3;  
019 NWNE,SENE,E2NW;  
019 NESW,NESE,S2SE;  
029 ALL;  
030 LOTS 1,2;  
030 NE,E2NW;  
031 LOTS 3,4;  
031 E2SW,SE;  
032 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_NSO\_PHMAL  
WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat.

TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

WY-204Q-6939 2076.440 Acres  
T.0370N,R.0780W, 06th PM, WY  
Sec. 019 E2,E2NW,SESW;  
029 ALL;  
030 LOTS 1-4;

030 E2,E2W2;  
031 E2E2,SWSE;  
032 W2W2;  
Natrona County  
Casper FO  
Formerly Lease No.

Stipulations:  
Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Mar 15 to Jun 30; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only).

TLS (1) Dec 1 to Mar 14; (2) as mapped on the Casper Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-grouse winter concentration areas in designated PHMAs (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-grouse that attend leks within designated PHMAs (Core only).

CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the Casper Field Office GIS database; (3) to protect Greater Sage-grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss.

This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-grouse designated PHMAs (Core only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.

WY-204Q-6940 2560.000 Acres  
T.0260N,R.1030W, 06th PM, WY

Sec. 020 ALL;  
 021 ALL;  
 027 ALL;  
 028 ALL;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_NSO\_PHMAL  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA

WY-204Q-6941 2197.050 Acres  
 T.0380N,R.0780W, 06th PM, WY  
 Sec. 006 LOTS 1-7;  
 006 S2NE,SE,NW,E2SW,SE;  
 007 LOTS 1-4;  
 007 E2W2,SE;  
 017 W2E2,W2;  
 018 LOTS 2-4;  
 018 E2,E2W2;  
 Natrona County  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3

WY-204Q-6945 640.000 Acres  
 T.0380N,R.0780W, 06th PM, WY  
 Sec. 032 ALL;  
 Natrona County  
 Casper FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 TLS (1) Feb 1 to Jul 31; (2) as mapped  
 on the Casper Field Office GIS database;  
 (3) protecting nesting raptors.

WY-204Q-6949 2560.000 Acres  
 T.0260N,R.1040W, 06th PM, WY  
 Sec. 012 ALL;  
 013 ALL;  
 014 ALL;  
 015 ALL;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2

Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is  
 located wholly or partially within a big  
 game migration corridor designated by  
 the State of Wyoming. The lessee or  
 their designated operator will be  
 required to work with the BLM and the  
 State of Wyoming to take reasonable  
 measures (see 43 CFR 3101.1-2) to  
 maintain big game migration corridor  
 functionality pursuant to State of  
 Wyoming Executive Order 2020-1.  
 The BLM will encourage the use of  
 Master Development Plans for  
 operations proposed on this lease parcel  
 in accordance with Onshore Oil and Gas  
 Order No. 1.  
 WY\_SW\_NSO\_PHMAL  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as  
 mapped on the Rock Springs Field  
 Office GIS database; (3) protecting big  
 game crucial winter range.

WY-204Q-6950 2560.000 Acres  
 T.0260N,R.1040W, 06th PM, WY  
 Sec. 021 ALL;  
 022 ALL;  
 023 ALL;  
 024 ALL;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 Special Lease Notice: This parcel is  
 located wholly or partially within a big  
 game migration corridor designated by  
 the State of Wyoming. The lessee or  
 their designated operator will be  
 required to work with the BLM and the  
 State of Wyoming to take reasonable  
 measures (see 43 CFR 3101.1-2) to  
 maintain big game migration corridor  
 functionality pursuant to State of  
 Wyoming Executive Order 2020-1.  
 The BLM will encourage the use of  
 Master Development Plans for  
 operations proposed on this lease parcel  
 in accordance with Onshore Oil and Gas  
 Order No. 1.  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as  
 mapped on the Rock Springs Field  
 Office GIS database; (3) protecting big  
 game crucial winter range.

WY-204Q-6951 2191.440 Acres  
 T.0260N,R.1050W, 06th PM, WY  
 Sec. 002 LOTS 1,3,4;  
 002  
 SENE,S2NW,W2SW,E2SE,SWSE;  
 003 LOTS 1-4;  
 003 S2N2,S2;  
 004 LOTS 1-4;  
 004 S2N2,S2;  
 011 E2,W2NW,E2SW;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as  
 mapped on the Rock Springs Field  
 Office GIS database; (3) protecting big  
 game crucial winter range.  
 NSO (1) surface occupancy or use  
 within 1/4 mile or visual horizon of the  
 trail, whichever is closer, may be  
 restricted or prohibited unless the  
 operator and surface managing agency  
 arrive at an acceptable plan for  
 mitigation of anticipated impacts; (2) as  
 mapped on the Rock Springs Field  
 Office GIS database; (3) protecting  
 cultural and scenic values of the Sublette  
 Cutoff of the California National  
 Historic Trail.

WY-204Q-6952 1920.000 Acres  
 T.0260N,R.1050W, 06th PM, WY  
 Sec. 022 S2NE,NESW,SWSW,SE;  
 027 ALL;  
 028 E2;  
 033 E2,E2W2,S2NW,W2SW;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as  
 mapped on the Rock Springs Field  
 Office GIS database; (3) protecting big  
 game crucial winter range.  
 TLS (1) Feb 1 to July 31; (2) as  
 mapped on the Rock Springs Field  
 Office GIS database; (3) protecting  
 nesting Raptors.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-6953 40.000 Acres  
T.0260N, R.1050W, 06th PM, WY  
Sec. 032 SESW;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.  
Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3  
Lease Stipulation No. 1

Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Oregon, California, Mormon Pioneer and Pony Express National Historic Trails.

WY-204Q-6954 1280.000 Acres  
T.0260N, R.1050W, 06th PM, WY  
Sec. 034 ALL;

035 ALL;  
Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3

Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat. TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

WY-204Q-6955 560.100 Acres  
T.0260N, R.1060W, 06th PM, WY  
Sec. 003 LOTS 4;  
003 SWNW, W2SW;  
010 W2NW, S2;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL  
WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-6956 2544.000 Acres  
T.0260N, R.1060W, 06th PM, WY  
Sec. 004 LOTS 1-4;

004 S2N2, S2;  
005 LOTS 1-4;  
005 S2N2, S2;  
006 LOTS 1-7;  
006 S2NE, SENW, E2SW, SE;  
007 LOTS 1-4;  
007 E2, E2W2;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3

Lease Stipulation No. 1  
Lease Stipulation No. 2  
Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA  
WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat.

TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-6957 2560.000 Acres  
T.0260N, R.1060W, 06th PM, WY  
Sec. 008 ALL;

009 ALL;  
014 ALL;  
015 ALL;

Sweetwater County  
Rock Springs FO  
Formerly Lease No.

Stipulations:

Lease Notice No. 1  
Lease Notice No. 2  
Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_PHMAL

WY\_SW\_TLS\_PHMAWCA

WY\_SW\_CSU\_PHMA

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

NSO (1) as mapped on the Rock Springs Field Office GIS database; (2) protecting raptor nesting habitat.

TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.

NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-6958 2560.000 Acres

T.0260N, R.1060W, 06th PM, WY  
 Sec. 021 ALL;  
 022 ALL;  
 028 ALL;  
 029 ALL;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHEMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.

WY-204Q-6959 2557.640 Acres  
 T.0260N, R.1070W, 06th PM, WY  
 Sec. 001 LOTS 1-4;  
 001 S2N2,S2;  
 002 LOTS 1-4;  
 002 S2N2,S2;  
 003 LOTS 1-4;  
 003 S2N2,S2;  
 004 LOTS 1-4;  
 004 S2N2,S2;  
 Sweetwater County  
 Rock Springs FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHMAL  
 WY\_SW\_TLS\_PHEMAWCA  
 WY\_SW\_CSU\_PHMA  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting big game crucial winter range.  
 TLS (1) Feb 1 to July 31; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting nesting Raptors.  
 NSO (1) surface occupancy or use within 1/4 mile or visual horizon of the trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Rock Springs Field Office GIS database; (3) protecting cultural and scenic values of the Sublette Cutoff of the California National Historic Trail.

WY-204Q-6960 1980.070 Acres  
 T.0300N, R.1090W, 06th PM, WY

Sec. 015 ALL;  
 030 LOTS 1-4;  
 030 E2,E2W2;  
 031 LOTS 1-4;  
 031 E2,E2W2;  
 Sublette County  
 Pinedale FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
 WY\_SW\_TLS\_PHEMAWCA  
 CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.  
 TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.  
 CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.  
 TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.  
 CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.  
 TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.  
 CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.  
 CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 1,341.765 acres**  
**T.0300N, R.1090W, 06th PM, WY**  
**Sec. 030 LOTS 1-4;**

**030 E2,E2W2;**  
**031 LOTS 1-4;**  
**031 E2,E2W2;**  
**Unavailable for leasing Pinedale RMP**  
**2008 page 2-22.**

WY-204Q-6961 1575.880 Acres  
 T.0300N, R.1100W, 06th PM, WY  
 Sec. 007 LOTS 1-4;  
 007 E2,E2W2;  
 008 ALL;  
 009 W2;  
 Sublette County  
 Pinedale FO  
 Formerly Lease No.  
 Stipulations:  
 Lease Notice No. 1  
 Lease Notice No. 2  
 Lease Notice No. 3  
 Lease Stipulation No. 1  
 Lease Stipulation No. 2  
 Lease Stipulation No. 3  
[Special Lease Notice: This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures \(see 43 CFR 3101.1-2\) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.](#)  
~~WY\_SW\_NSO\_GHMAL~~  
~~WY\_SW\_NSO\_PHMAL~~  
 WY\_SW\_TLS\_GHMAL  
 NSO (1) as mapped on the Pinedale Field Office GIS database; (2) buffering No Lease areas.  
 CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting Class I and II Visual Resource Management Areas.  
 CSU (1) Surface occupancy and use outside the quarter mile NSO for the Lander Road, but within the viewshed of the trail, will be restricted or prohibited pending evaluation of effects to the historic setting of the trail through the Section 106 process and potential Memorandum of Agreement to mitigate adverse effects; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting the Lander Trail.  
 TLS (1) Nov 15 to Apr 30; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Big game migration routes will be protected. Known big game migration bottleneck areas are available for oil and gas leasing with NSO restrictions, unless other protection is provided; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy (permanent facilities) within 1000 feet of active raptor nests, within 1400 feet of Ferruginous hawk nests, and 2600 feet of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting raptor nesting areas.

TLS (1) April 1 through August 15 within one half-mile of burrowing owl habitat; (2) as mapped on the Pinedale Field Office GIS database or as determined by a pre-disturbance raptor survey; (3) protecting burrowing owl nesting habitat.

TLS (1) Feb 1 to Aug 15 within 1 mile of bald eagle nests; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting bald eagle nesting habitat.

TLS (1) No surface disturbing activities or human activities Nov 1 to April 1 within 1 mile of bald eagle winter roosts; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) No surface disturbing activities within a radius of one-half mile April 15 to August 15; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting yellow billed cuckoo nesting habitat.

CSU (1) Pygmy rabbit burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

TLS (1) Apr 10-Jul 10; (2) as mapped on the Pinedale Field Office GIS database; (3) protecting nesting mountain plover.

CSU (1) Avoid white-tailed prairie dog towns greater than 12.5 acres in size; (2) as mapped on the Pinedale Field Office GIS database.

CSU (1) White-tailed prairie dog burrows require avoidance of the burrow by 50 feet; (2) as mapped on the Pinedale Field Office GIS database.

**Delete in part 1,293.634 acres  
T.0300N, R.1100W, 06th PM, WY**

**Sec. 007 LOTS 1-4;**

**007 E2,E2W2;**

**008 N2,SW,W2SE,NESE;**

**009 W2NW;**

**Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-6962 720.000 Acres  
T.0300N, R.1100W, 06th PM, WY

Sec. 027 NENE,S2NE,SENE,S2;

028 S2S2;

029 E2SE;

Sublette County

Pinedale FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

**Delete in full 720.000 acres**

**Unavailable for leasing Pinedale RMP  
2008 page 2-22.**

WY-204Q-6963 2080.050 Acres

T.0390N, R.0780W, 06th PM, WY

Sec. 002 LOTS 1-4;

002 S2N2;

004 LOTS 2, 3;

004 SWNE,SENE;

011 N2,N2S2,S2SE;

012 NE, E2NW,

SW,W2SE,NESE;

013 NENE,W2NE,W2,W2SE;

Natrona County

Casper FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

CSU (1) Surface occupancy or use within 0.25 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Casper Field Office GIS database; (3) protecting nesting raptors.

WY-204Q-6965 2413.220 Acres

T.0400N, R.0780W, 06th PM, WY

Sec. 003 LOTS 1-4;

003 S2N2,E2SW,SE;

004 LOTS 1-4;

004 SENE;

005 LOTS 1-4;

005 S2N2,S2;

010 NE;

013 ALL;

024 NENE,S2N2,NWNW;

Natrona County

Casper FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

WY\_SW\_TLS\_GHMAL

CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

WY-204Q-6966 1560.000 Acres

T.0400N, R.0780W, 06th PM, WY

Sec. 025 NE,N2SW,SWSW,NWSE;

026 W2NE,SENE,W2,SE;

035 ALL;

Natrona County

Casper FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Lease Stipulation No. 1

Lease Stipulation No. 2

Lease Stipulation No. 3

CSU (1) Surface occupancy or use within 3 miles or visual horizon of the historic trail, whichever is closer, may be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Casper Field Office GIS database; (3) protecting cultural and scenic values of the Bozeman Trail.

## 5.4.1 Lease Stipulation Code Index

STIPULATION CODE	STIPULATION LANGUAGE
WY_BFO_CSU_BEGE	CSU (1) Prior to surface disturbance within 1.0 mile of consistently used bald and golden eagle winter roosts and riparian corridors a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer’s satisfaction that wintering eagles will not be disturbed (as defined by the Bald and Golden Eagle Protection Act). Bald or golden eagles will not be agitated or bothered to a degree that causes or is likely to cause physical injury, or a decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; (2) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) protecting bald and golden eagle winter roosting habitat.
WY_BFO_CSU_BGCW	CSU (1) Prior to surface disturbance within Wyoming Game and Fish Department designated big game crucial winter range, a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer’s satisfaction that the function and suitability of crucial big game winter ranges will not be impaired; (2) as mapped by the Wyoming Game and Fish Department; (3) ensuring the function and suitability of crucial big game winter range.
WY_BFO_CSU_C100F	CSU (1) Prior to surface disturbance or disruptive activities near an entrance to a significant cave a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the BLM Authorized Officer’s satisfaction that the action will not destroy, disturb, deface, mar, alter, remove, or harm any significant cave or alter the free movement of any animal or plant life into or out of any significant cave; (2) as mapped by the BLM; (3) protecting significant cave resources (any material or substance occurring naturally in caves, such as animal life, plant life, paleontological deposits, sediments, minerals, speleogens, and speleothems).
WY_BFO_CSU_CLBA	CSU (1) Surface use or occupancy shall not be allowed by oil and gas lessee(s), operating rights holder(s), and/or oil and gas operator(s) on this Federal oil and gas lease to conduct any oil and gas operation, including drilling for, removing, or disposing of oil and/or gas contained in Federal coal lease(s) unless a plan for mitigation of anticipated impacts is developed between the oil and gas and the coal lessees, and the Plan is approved by the BLM Authorized Officer; (2) on areas identified as highly likely to be considered in a Coal Lease By Application as mapped by the US Office of Surface Mining, Wyoming Department of Environmental Quality, US Geological Survey, and/or BLM; (3) protecting the first in time valid existing rights of the coal lessee, the BLM Authorized Officer reserves the right to alter or modify any oil and gas operations on the lands described in this lease ensuring the orderly development of the coal resource by surface and/or underground mining methods, coal mine worker safety, and/or coal production rates or recovery of the coal resource. The oil and gas lessee(s), operating rights holder(s), and/or oil and gas operator(s) of this Federal oil and gas lease shall not hold the United States as lessor, coal lessee(s), sub-lessee(s), and/or coal operator(s) liable for any damage or loss of the oil and gas resource, including the venting of coalbed natural gas, caused by coal exploration or mining operations conducted on Federal coal lease.
WY_BFO_CSU_EC	CSU (1) Prior to surface disturbance within Wyoming Game and Fish Department designated elk calving areas a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form

	3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that the function and suitability of elk calving areas will not be impaired; (2) as mapped by the Wyoming Game and Fish Department; (3) ensuring the function and suitability of elk calving areas.
WY_BFO_CSU_ECWC	CSU (1) Fluid mineral production and byproducts shall be piped out of, and permanent above ground facilities will be located outside of, Wyoming Game and Fish Department designated elk crucial winter range and calving areas unless a mitigation plan (Plan) is submitted by the applicant and approved by the BLM as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that the function and suitability of elk crucial winter range and elk calving areas will not be impaired; (2) as mapped by the Wyoming Game and Fish Department; (3) ensuring the function and suitability of elk crucial winter range and elk calving areas.
WY_BFO_CSU_FCR	CSU (1) Surface-disturbing and disruptive activities shall only be approved with adequate mitigation to ensure compliance with the Fortification Creek Resources Management Plan Amendment (BLM 2011) performance standards. Prior to surface disturbance within the Fortification Creek Planning Area a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate); (2) within the Fortification Creek Planning Area (Map 3-36); (3) protecting the viability of the Fortification elk herd and facilitating ecosystem reconstruction in the stabilization of disturbed areas.
WY_BFO_CSU_FQM	CSU (1) Prior to surface disturbance within 0.25 mile of naturally occurring water bodies containing native or desirable non-native fish species a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that there will not be a local decline in fish abundance or range as a result of the lease operations. Examples of a few of the items to consider are as follows. Spill prevention measures must be used to ensure hydrocarbons and other potentially toxic substances used for lease activities are prevented from entering the watercourse. Sediment control measures must be used to ensure increased sediment contributions are avoided; (2) as mapped by the Wyoming Game and Fish Department and/or BLM; (3) protecting native and desirable non-native fish populations and habitat.
WY_BFO_CSU_GSGRH	CSU (1) All applicable surface disturbances (existing or future, and not limited to fluid mineral disturbances) must be restored, as described in the Buffalo Field Office Resource Management Plan, to the approval of the BLM Authorized Officer; (2) Greater Sage-Grouse Core Population Areas and Connectivity Corridors (Priority Habitat) as mapped on the Buffalo Field Office GIS database; (3) to restore functional Greater Sage-Grouse habitat to support core Greater Sage-Grouse populations.
WY_BFO_CSU_H	CSU (1) Prior to surface disturbance within 3 miles of the Pumpkin Buttes, Cantonment Reno, Dull Knife Battle, and Crazy Woman Battle historic properties, contributing and unevaluated segments of the Bozeman Trail, all rock art sites, all rock shelter sites, and all Native American burials, a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the

	BLM Authorized Officer has approved the Plan or approved it with conditions after consultation with the State Historic Preservation Office, applicable Indian tribes, and other interested parties. The Plan must demonstrate to the Authorized Officer's satisfaction that there will be no adverse effects to National Register of Historic Places eligible or listed historic properties (i.e., the infrastructure will either not be visible or will result in a weak contrast rating); (2) as mapped on the Buffalo Field Office GIS database; (3) ensuring the setting of historic properties.
WY_BFO_CSU_H20500F	CSU (1) Prior to surface disturbance within 500 feet of springs, reservoirs not associated with coal bed natural gas projects, water wells, and perennial streams a site-specific construction, stabilization, and reclamation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the BLM Authorized Officer's satisfaction how the operator will meet the following performance standards. Storm water and surface runoff will be controlled to minimize erosion (rilling, gullyng, piping, mass wasting) and offsite siltation during construction, use/operations, and reclamation. Offsite areas will be protected from accelerated soil erosion. The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation; (2) as mapped by the US Geological Survey's National Hydrologic Inventory and/or as determined by a BLM evaluation of the area; (3) ensuring protection of surface waters and associated riparian habitats by meeting the standards outlined in, Chapter 6 of the BLM's Oil and Gas Gold Book, as revised, and the 2015 Buffalo Field Office Resource Management Plan Record of Decision.
WY_BFO_CSU_PD	CSU (1) Prior to surface disturbance within active prairie dog colonies on BLM-administered surface a special status species occupancy survey must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that activities with active prairie dog colonies on BLM surface would not adversely impact suitable habitat for special status species dependent upon prairie dog colonies; (2) as mapped or determined on the Buffalo Field Office GIS database or from field evaluation, in coordination with the US Fish and Wildlife Service and Wyoming Game and Fish Department; (3) conserving special status species wildlife and the prairie dog colonies on which they depend.
WY_BFO_CSU_PHMAC	CSU (1) Surface occupancy or use will be restricted. The cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the Disturbance Density Calculation Tool (DDCT) area, as described in the DDCT manual; (2) as mapped on the Buffalo Field Office GIS database; (3) to protect Greater Sage-Grouse designated Priority Habitat Management Areas (Connectivity only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-Grouse designated PHMAs (Connectivity only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Connectivity only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.
WY_BFO_CSU_R500F	CSU (1) Prior to surface disturbance within 500 feet of riparian systems, wetlands, and aquatic habitats a site-specific construction, stabilization, and reclamation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with

	<p>conditions, as appropriate). The Plan must demonstrate to the BLM Authorized Officer's satisfaction how the operator will meet the following performance standards. Storm water and surface runoff will be controlled to minimize erosion (rilling, gully, piping, mass wasting) and offsite siltation during construction, use/operations, and reclamation. Offsite areas will be protected from accelerated soil erosion. The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation; (2) as mapped by the US Geological Survey's National Hydrologic Inventory and/or as determined by a BLM evaluation of the area; (3) ensuring protection of surface waters and associated riparian habitats by meeting the standards outlined in, Chapter 6 of the BLM's Oil and Gas Gold Book, as revised, and the 2015 Buffalo Field Office Resource Management Plan Record of Decision.</p>
WY_BFO_CSU_RN	<p>CSU (1) Prior to surface disturbance within US Fish and Wildlife Service recommended spatial buffers of raptor nests a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that nesting raptors will not be disturbed. Nesting raptors will not be agitated or bothered to a degree that causes or is likely to cause physical injury, a decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior; (2) as mapped on the Buffalo Field Office GIS database or determined by the BLM from field evaluation in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring raptor productivity.</p>
WY_BFO_CSU_SE	<p>CSU (1) Prior to surface disturbance on soils with a severe erosion hazard rating a site-specific construction, stabilization, and reclamation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the BLM Authorized Officer's satisfaction how the operator will meet the following performance standards. The disturbed area will be stabilized with no evidence of accelerated erosion features. The disturbed area shall be managed to ensure soil characteristics approximate an appropriate reference site with regard to erosional features to maintain soil productivity and sustainability. Sufficient viable topsoil is maintained for ensuring successful final reclamation. At locations where interim reclamation will be completed, this will be accomplished by respreading all salvaged topsoil over the areas of interim reclamation. The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation; (2) as mapped by the Natural Resources Conservation Service Soil Survey Geographic Database (SSURGO) Order 3 soil survey and/or as determined by a BLM evaluation of the area; (3) ensuring successful reclamation and erosion control on soils with a severe erosion hazard rating in order to meet the standards outlined in Chapter 6 the BLM's Oil and Gas Gold Book, as revised, and the 2015 Buffalo Field Office Resource Management Plan Record of Decision.</p>
WY_BFO_CSU_Slopes25to50	<p>CSU (1) Prior to surface disturbance on slopes greater than 25% and less than 50% a site-specific construction, stabilization, and reclamation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The Plan must include designs approved and stamped by a licensed engineer. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the BLM Authorized Officer's satisfaction how the operator will meet the following performance standards. Slope stability is maintained preventing slope failure or mass wasting. The disturbed area will be stabilized with no evidence of accelerated erosion features. The disturbed</p>

	<p>area shall be managed to ensure soil characteristics approximate an appropriate reference site with regard to erosional features to maintain soil productivity and sustainability. Sufficient viable topsoil is maintained for ensuring successful final reclamation. At locations where interim reclamation will be completed, this will be accomplished by respreading all salvaged topsoil over the areas of interim reclamation. The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation; (2) as mapped by the US Geological Survey (USGS) 1:24,000 scale topographic maps, USGS Digital Elevation Models, and/or as determined by a BLM evaluation of the area; (3) ensuring successful reclamation and erosion control on slopes greater than 25% and less than 50% in order to meet the standards outlined in Chapter 6 of the BLM's Oil and Gas Gold Book, as revised, and the 2015 Buffalo Field Office Resource Management Plan Record of Decision.</p>
WY_BFO_CSU_SLR	<p>CSU (1) Prior to surface disturbance on limited reclamation potential areas a site-specific construction, stabilization, and reclamation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The Plan must include designs approved and stamped by a licensed engineer. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the BLM Authorized Officer's satisfaction how the operator will meet the following performance standards. The disturbed area will be stabilized with no evidence of accelerated erosion features. The disturbed area shall be managed to ensure soil characteristics approximate an appropriate reference site with regard to erosional features to maintain soil productivity and sustainability. Slope stability is maintained preventing slope failure and erosion. Sufficient viable topsoil is maintained for ensuring successful final reclamation. At locations where interim reclamation will be completed, this will be accomplished by respreading all salvaged topsoil over the areas of interim reclamation. The original landform and site productivity will be partially restored during interim reclamation and fully restored as a result of final reclamation; (2) as mapped by the Natural Resources Conservation Service Soil Survey Geographic Database (SSURGO) Order 3 soil survey and as determined by a BLM evaluation of the area; (3) ensuring successful reclamation and erosion control on limited reclamation potential areas in order to meet the standards outlined in, Chapter 6 of the BLM's Oil and Gas Gold Book, as revised, and the 2015 Buffalo Field Office Resource Management Plan Record of Decision.</p>
WY_BFO_CSU_SSP	<p>CSU (1) Prior to surface disturbance within Ute ladies'-tresses orchid habitat flowering season survey(s) must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that Ute ladies'-tresses orchids will not be harmed and that the habitat on which they depend will be conserved; (2) as mapped or determined by the US Fish and Wildlife Service, Wyoming Natural Diversity Database, the Buffalo Field Office GIS database, or from field evaluation; (3) conserving Ute ladies'-tresses orchids and the habitat on which they depend.</p>
WY_BFO_CSU_SSPF	<p>CSU (1) Prior to surface disturbance within special status plant species habitats, flowering season surveys must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that special status plant species will not be harmed and that the habitat on which they depend will be conserved; (2) as mapped or determined by the US Fish and Wildlife Service, Wyoming Natural Diversity Database, the Buffalo Field Office</p>

	GIS database, or from field evaluation; (3) conserving special status plant species and the habitat on which they depend.
WY_BFO_CSU_SSWLA	CSU (1) Prior to surface disturbance within 1,640 feet (500 meters) of perennial water, vernal pools, playas, and wetlands appropriate surveys must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan or approved it with conditions. The Plan must demonstrate to the Authorized Officer's satisfaction that special status amphibian species will not be disturbed to a degree that causes or is likely to cause physical injury, a decrease in productivity by substantially interfering with normal breeding, sheltering, or hibernation behavior, or site abandonment by substantially interfering with normal breeding, sheltering, or hibernation behavior; (2) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring production of special status amphibian species breeding, sheltering, and hibernation habitat.
WY_BFO_CSU_SSWLB	CSU (1) Prior to surface disturbance within 1,640 feet (500 meters) of cave entrances, mature forest, and rock outcrops appropriate surveys must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan or approved it with conditions. The Plan must demonstrate to the Authorized Officer's satisfaction that special status bat species will not be disturbed to a degree that causes or is likely to cause physical injury, a decrease in productivity by substantially interfering with normal breeding, nursery, roosting, or hibernation behavior, or site abandonment by substantially interfering with normal breeding, nursery, roosting, or hibernation behavior; (2) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring protection of special status bat species breeding, nursery, roosting, and hibernation habitat.
WY_BFO_CSU_SSWLH	CSU (1) Prior to surface disturbance within special status species wildlife habitat an occupancy survey must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer's satisfaction that special status wildlife species will not be harmed (any act which actually kills or injures wildlife including habitat modification or degradation that substantially impairs essential behavioral patterns) and that the habitat on which they depend will be conserved; (2) as mapped or determined by the US Fish and Wildlife Service, Wyoming Game and Fish Department, Wyoming Natural Diversity Database, or BLM from field evaluation; (3) conserving special status species wildlife and the habitat on which they depend (BLM 2008 -6840 manual).
WY_BFO_CSU_SSWLR	CSU (1) Prior to surface disturbance within 1,640 feet (500 meters) of south facing rock outcrops, perennial water, vernal pools, playas, and wetlands appropriate surveys must be conducted and a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator may not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan or approved it with conditions. The Plan must demonstrate to the Authorized Officer's satisfaction that special status reptile species will not be disturbed to a degree that causes or is likely to cause physical injury, a decrease in productivity by substantially interfering with normal breeding, basking, sheltering, or hibernation behavior, or site abandonment by substantially interfering with normal breeding, basking, sheltering, or hibernation behavior; (2) as

	mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring production of special status reptile species breeding, basking, sheltering, and hibernation habitat.
WY_BFO_CSU_STG	CSU (1) Prior to surface disturbance within 0.25 mile of the perimeter of occupied sharp-tailed grouse leks a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer’s satisfaction that the function and suitability of sharp-tailed grouse breeding habitat will not be impaired (result in physical injury, a decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or lek abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior); (2) as mapped by the Wyoming Game and Fish Department; (3) ensuring the function and suitability of sharp-tailed grouse breeding habitat.
WY_BFO_CSU_TCP	CSU (1) Prior to surface disturbance within 3 miles of traditional cultural properties a mitigation plan (Plan) must be submitted by the applicant. The Plan must be approved or approved with conditions by the BLM Authorized Officer prior to surface-disturbing activities after consultation with the State Historic Preservation Office, applicable Indian tribes, and other interested parties. The Plan must demonstrate there will be no adverse effects to National Register of Historic Places eligible or listed historic properties (i.e., proposed infrastructure is either not visible or will result in a weak contrast rating); (2) as mapped on the Buffalo Field Office GIS database; (3) ensuring the setting of traditional cultural properties.
WY_BFO_CSU_VRMII	CSU (1) Prior to surface disturbance within Visual Resource Management (VRM) Class 2 areas, a site-specific plan must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the plan (with conditions, as appropriate). The plan must demonstrate to the BLM Authorized Officer’s satisfaction how the operator will meet the following performance standards. A visual contrast rating must demonstrate that VRM Class 2 objectives will be met. Where required by the BLM Authorized Officer, a visual simulation must be prepared and must demonstrate that VRM Class 2 objectives will be met through practices such as siting of permanent facilities. Where present and feasible, existing surface disturbances shall be utilized. New surface disturbances shall be minimized to the extent practicable. All permanent above-ground facilities (such as production tanks or other production facilities) not having specific coloration requirements for safety must be painted or designed using a BLM-approved color; (2) as mapped on the Buffalo Field Office GIS database; (3) protecting VRM Class 2 areas.
WY_BFO_CSU_WHSRMA	CSU (1) Prior to surface disturbance within Special Recreation Management Areas (SRMAs) available for leasing (Weston Hills) a mitigation plan (Plan) must be submitted to the BLM by the applicant as a component of the Application for Permit to Drill (BLM Form 3160-3) or Sundry Notice (BLM Form 3160-5) – Surface Use Plan of Operations. The operator shall not initiate surface-disturbing activities unless the BLM Authorized Officer has approved the Plan (with conditions, as appropriate). The Plan must demonstrate to the Authorized Officer’s satisfaction that the proposed action is consistent with the prescribed management for the SRMA; (2) as mapped or determined by BLM; (3) ensuring the recreational opportunities and setting of the SRMA.
WY_BFO_NSO_BEGE	NSO (1) Within 0.5 miles from the edge of consistently used bald or golden eagle winter roosts and Clear Creek, Crazy Woman Creek, Piney Creek, Powder River, and Tongue River, consistently used riparian corridors, as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with

	the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (2) protecting wintering bald and golden eagles.
WY_BFO_NSO_BEN	NSO (1) Within 0.5 mile of bald eagle nests as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (2) ensuring productivity of bald eagles.
WY_BFO_NSO_BGHMA	NSO (1) Within Wyoming Game and Fish Department Big Game Habitat Management Areas (Ed O. Taylor, Kerns, Bud Love, and Amsden Creek) as mapped by the Wyoming Game and Fish Department; (2) ensuring the function and suitability of Wyoming Game and Fish Department Big Game Habitat Management Areas.
WY_BFO_NSO_H	NSO (1) Within the Pumpkin Buttes, Cantonment Reno, Dull Knife Battle, and Crazy Woman Battle historic properties, contributing and unevaluated segments of the Bozeman Trail, all rock art sites, all rock shelter sites, all Native American burials; as mapped on the Buffalo Field Office GIS database; (2) protecting historic properties.
WY_BFO_NSO_HIP	NSO (1) No surface occupancy or use is allowed on lands containing paleontological resources of high quality or importance as mapped on the Buffalo Field Office GIS database; (2) protecting paleontological resources of high quality or importance.
WY_BFO_NSO_PBACEC	NSO (1) Within the Pumpkin Buttes Area of Critical Environmental Concern as mapped or determined by BLM; (2) protecting the relevant and important values.
WY_BFO_NSO_Slopes50	NSO (1) On slopes greater than 50% as mapped by the US Geological Survey 1:24,000 scale topographic maps, US Geological Survey Digital Elevation Models, and/or as determined by a BLM evaluation of the area; (2) preventing mass slope failure and accelerated erosion.
WY_BFO_NSO_SSF	NSO (1) Within 0.25 mile of any waters containing special status fish species as mapped on the Buffalo Field Office GIS database or from field evaluation, in consultation with the Wyoming Game and Fish Department; (2) protecting special status fish populations and habitat.
WY_BFO_NSO_SSP	NSO (1) Within special status species plant populations as mapped on the Buffalo Field Office GIS database, or determined by BLM from field evaluation, in coordination with the Wyoming Natural Diversity Database and/or US Fish and Wildlife Service; (2) protecting special status species plant populations.
WY_BFO_NSO_SSRN	NSO (1) Within a species specific spatial buffer of special status species raptor nests using US Fish and Wildlife Service Wyoming Ecological Service's recommendations (Appendix Q (p. 633) or <a href="http://www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html">www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html</a> ) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (2) protecting nest sites of special status raptors.
WY_BFO_NSO_TCP	NSO (1) On lands containing traditional cultural properties as mapped on the Buffalo Field Office GIS database; (2) protecting traditional cultural properties.
WY_BFO_TLS_BEN	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted from Feb 1 to Aug 15 within 1.0 mile of active bald eagle nests; (2) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring productivity of bald eagles.
WY_BFO_TLS_BGCWEC	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted from Nov 15 to Apr 30 within big-game crucial winter range, or from May 1 to Jun 15 within elk calving areas (Wyoming Game and Fish Department 2009); (2) as mapped by the Wyoming Game and Fish Department and evaluated by the BLM; (3) ensuring the function and suitability of crucial big game winter ranges.
WY_BFO_TLS_EC	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted from May 1 to Jun 15 within elk calving areas (Wyoming Game and Fish Department

	2009); (2) as mapped by the Wyoming Game and Fish Department and evaluated by the BLM; (3) ensuring the function and suitability of elk calving areas.
WY_BFO_TLS_EWR	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted from Nov 1 to Apr 1 within 1.0 mile from the edge of consistently used eagle winter roosts and the following consistently used riparian corridors: Clear Creek, Crazy Woman Creek, Piney Creek, Powder River, and Tongue River; (2) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) protecting roosting eagles.
WY_BFO_TLS_NSSRN	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted within the US Fish and Wildlife Service Wyoming Ecological Service's recommended spatial buffers and dates of active non-special status species raptor nests. (Appendix Q (p. 633) or <a href="http://www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html">www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html</a> ); (2) as mapped on the Buffalo Field Office GIS database or determined by BLM from field evaluation in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring raptor nest productivity.
WY_BFO_TLS_PHMAC	TLS (1) Mar 15 to Jun 30; (2) as mapped on the Buffalo Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-Grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside Priority Habitat Management Areas (Connectivity only), within 4 miles of an occupied lek.
WY_BFO_TLS_PHMAL	TLS (1) Mar 15 to Jun 30; (2) as mapped on the Buffalo Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-Grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only). Where credible data support different timeframes for this restriction, dates may be expanded by 14 days prior or subsequent to the above dates.
WY_BFO_TLS_PHMAWCA	TLS (1) Dec 1 to Mar 14; (2) as mapped on the Buffalo Field Office GIS database; (3) to seasonally protect Greater Sage-Grouse winter concentration areas in designated Priority Habitat Management Areas (Core and Connectivity), and outside designated PHMAs (Core and Connectivity) when supporting wintering Greater Sage-Grouse that attend leks within designated PHMAs (Core only).
WY_BFO_TLS_SSRN	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted within US Fish and Wildlife Service recommended spatial buffers and dates (Appendix Q (p. 633) or <a href="http://www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html">www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html</a> ) of active raptor nests of special status species; (2) as mapped on the Buffalo Field Office GIS database or determined by field evaluation, in coordination with the Wyoming Game and Fish Department and/or US Fish and Wildlife Service; (3) ensuring productivity of nesting special status raptors.
WY_BFO_TLS_STG	TLS (1) Surface-disturbing and disruptive activities are prohibited or restricted from Apr 1 to Jul 15 (Wyoming Game and Fish Department 2009) within 2 miles of the perimeter of occupied sharp-tailed grouse leks; (2) as mapped by the Wyoming Game and Fish Department and evaluated by the BLM; (3) ensuring the function and suitability of sharp-tailed grouse nesting habitat.
WY_LFO_CSU_BRMLP2024	CSU (1) Surface occupancy or use will be restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting unique plant communities, cultural sites, viewshed, geologic resources, wild horse migration routes, and riparian-wetland resources of the Beaver Rim Master Leasing Plan analysis area.
WY_LFO_CSU_LRPS1013	CSU (1) Surface occupancy or use will be restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting limited reclamation potential soils.
WY_LFO_CSU_PYFC5058	CSU (1) Surface use or occupancy is restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting fossil resources within designated "very high" or "high" potential fossil yield classification areas.
WY_LFO_CSU_RHTEH5018	CSU (1) Surface use or occupancy will be restricted within a 2-mile buffer of Regional Historic Trails and Early Highways; (2) as mapped on the Lander Field Office GIS

	database; (3) protecting the Regional Historic Trails and Early Highways and their settings.
WY_LFO_CSU_S15TO24P1014	CSU (1) Surface occupancy or use will be restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting areas containing slopes between 15 and 24 percent.
WY_LFO_CSU_SR6124	CSU (1) Surface use or occupancy is restricted within the Sweetwater Rocks viewshed; (2) as mapped on the Lander Field Office GIS database; (3) protecting the Sweetwater Rocks periphery.
WY_LFO_CSU_VRM5066	CSU (1) Surface occupancy or use is restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting VRM Class I and II areas.
WY_LFO_CSU1048	CSU (1) Surface occupancy and use will be restricted; (2) as mapped on the Lander field Office GIS database; (3) protecting 100-year floodplains and riparian-wetland areas.
WY_LFO_CSU2024	CSU (1) Surface occupancy and use will be restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting 100-year floodplains within the Beaver Rim Master Leasing Plan analysis area.
WY_LFO_CSU5025	CSU (1) Surface use or occupancy will be restricted; (2) as mapped on the Lander Field Office GIS database; (3) protecting the Cedar Ridge Traditional Cultural Property periphery.
WY_LFO_NSO_ACEC7059	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting the relevant and important Area of Critical Environmental Concern values.
WY_LFO_NSO_BRH4095	NSO (1) Within 0.25-mile of identified bat maternity roosts and hibernation sites as mapped on the Lander Field Office GIS database; (2) protecting bat maternity roosts and hibernation sites.
WY_LFO_NSO_BRMLP2024	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting unique plant communities, cultural sites, viewshed, and geologic resources in the Beaver Rim Master Leasing Plan area.
WY_LFO_NSO_CG5034	NSO (1) as mapped on the Lander Field Office GIS database; (2) protecting the Castle Gardens cultural site and periphery.
WY_LFO_NSO_HTAC4045	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting wildlife, cultural resources, viewshed, and/or recreational use(s) in the Hudson to Atlantic City area.
WY_LFO_NSO_NTMC7002	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting Congressionally Designated Trails and their settings.
WY_LFO_NSO_OPR4088	NSO (1) Within 200 feet of occupied pygmy rabbit habitat, as mapped in the Lander Field Office GIS database; (2) protecting pygmy rabbit habitat.
WY_LFO_NSO_PSW4031	NSO (1) Within 500 feet of perennial surface waters, riparian-wetland areas, and/or playas, as mapped on the Lander Field Office GIS database; (2) protecting perennial surface waters, riparian-wetland areas, and/or playas outside of Designated Development Areas.
WY_LFO_NSO_PSWDDA4031	NSO (1) Within 500 feet of perennial surface waters, riparian-wetland areas, and/or playas, as mapped on the Lander Field Office GIS database; (2) protecting perennial surface waters, riparian-wetland areas, and/or playas within Designated Development Areas.
WY_LFO_NSO_REC6086	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting developed recreation sites.
WY_LFO_NSO_SG25P1014	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting areas containing slopes greater than 25 percent.
WY_LFO_NSO_YERMO4084	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting desert yellowhead population management areas.

WY_LFO_NSO1045	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting identified sole source aquifers.
WY_LFO_NSO2024	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting 100-year floodplains within the Beaver Rim Master Leasing Plan analysis area.
WY_LFO_NSO2031	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting resources within 0.25-mile of National Register of Historic Places-eligible Native America cultural resource sites.
WY_LFO_NSO4070	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting wildlife parturition areas and viewshed south of Green Mountain.
WY_LFO_NSO5024	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting the Cedar Ridge Traditional Cultural Property.
WY_LFO_NSO5050	NSO (1) As mapped on the Lander Field Office GIS database; (2) protecting Sacred, Spiritual, and Traditional Cultural Properties.
WY_LFO_TLS_BGCW4061	TLS (1) Nov 15 to Apr 30; (2) as mapped on the Lander Field Office database; (3) protecting big game crucial winter range.
WY_LFO_TLS_BGCWP4061	TLS (1) May 1 to Jun 30; (2) as mapped on the Lander Field Office database; (3) protecting big game parturition areas.
WY_LFO_TLS_EWR4062	TLS (1) Nov 15 to Apr 30; (2) as mapped on the Lander Field Office GIS database; (3) protecting elk winter range.
WY_LFO_TLS_FFS4053	TLS (1) Sep 15 to Nov 30; (2) as mapped on the Lander Field Office GIS database; (3) protecting fall spawning habitat within the identified bankfull channel width of fish-bearing streams.
WY_LFO_TLS_FSS4053	TLS (1) Mar 15 to Jul 31; (2) as mapped on the Lander Field Office GIS database; (3) protecting spring spawning habitat within the identified bankfull channel width of fish-bearing streams.
WY_LFO_TLS_MPN4094	TLS (1) Apr 10 to Jul 10; (2) within 0.25-mile of identified mountain plover habitat, as mapped on the Lander Field Office GIS database, (3) protecting mountain plover nesting habitat.
WY_LFO_TLS_PHMAWCA	TLS (1) Dec 1 to Mar 14; (2) as mapped on the Lander Field Office GIS database; (3) seasonally protecting Greater Sage-Grouse winter concentration areas.
WY_LFO_TLS_RN4071	TLS (1) Within 1 mile of bald eagle and ferruginous hawk nests and 0.75-mile of all other active raptor nests during the following time periods, Apr 1 to Aug 31 for northern goshawk, Apr 1 to Sep 15 for burrowing owl, Feb 1 to Aug 15 for bald and/or golden eagles, and Feb 1 to Jul 31 for all other raptors; (2) as mapped on the Lander Field Office GIS database; (3) protecting active raptor nests.
WY_NFO_CSU_PHMAC	CSU (1) Surface occupancy or use will be restricted. The cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the Disturbance Density Calculation Tool (DDCT) area, as described in the DDCT manual; (2) as mapped on the Newcastle Field Office GIS database; (3) to protect Greater Sage-Grouse designated Priority Habitat Management Areas (Connectivity only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-Grouse designated PHMAs (Connectivity only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Connectivity only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.
WY_NFO_TLS_PHMAC	TLS (1) Mar 15 to Jun 30; (2) as mapped on the Newcastle Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-Grouse breeding, nesting and

	early brood-rearing habitats (independent of habitat suitability) inside Priority Habitat Management Areas (Connectivity only), within 4 miles of an occupied lek.
WY_SW_CSU_PHMA	CSU (1) Surface occupancy or use will be restricted to no more than an average of one disturbance location per 640 acres using the Disturbance Density Calculation Tool (DDCT), and the cumulative value of all applicable surface disturbances, existing or future, must not exceed 5 percent of the DDCT area, as described in the DDCT manual; (2) as mapped on the applicable Field Office GIS database; (3) to protect Greater Sage-Grouse designated Priority Habitat Management Areas (Core only) from habitat fragmentation and loss. This lease does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas within Greater Sage-Grouse designated PHMAs (Core only). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on Federal, State, or private lands within designated PHMAs (Core only) or surface disturbance created by other land users. The BLM may require the lessee or operator to enter into a unit agreement or drilling easement to facilitate the equitable development of this and surrounding leases.
WY_SW_NSO_GHMAL	NSO (1) As mapped on the applicable Field Office GIS database; (2) to protect occupied Greater Sage-Grouse leks and associated seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse in proximity to leks from habitat fragmentation and loss, and protect Greater Sage-Grouse populations from disturbance within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks outside designated Priority Habitat Management Areas (Core and Connectivity).
WY_SW_NSO_PHMAL	NSO (1) As mapped on the applicable Field Office GIS database; (2) to protect occupied Greater Sage-Grouse leks and associated seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse in proximity to leks from habitat fragmentation and loss, and protect Greater Sage-Grouse populations from disturbance within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks inside designated Priority Habitat Management Areas (Core and Connectivity).
WY_SW_TLS_GHMAL	TLS (1) Mar 15 to Jun 30; (2) as mapped on the applicable Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-Grouse breeding, nesting and early brood-rearing habitats outside designated Priority Habitat Management Areas (Core and Connectivity), within 2 miles of an occupied lek.
WY_SW_TLS_PHMAL	TLS (1) Mar 15 to Jun 30; (2) as mapped on the applicable Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-Grouse breeding, nesting and early brood-rearing habitats (independent of habitat suitability) inside designated Priority Habitat Management Areas (Core only).
WY_SW_TLS_PHMAWCA	TLS (1) Dec 1 to Mar 14; (2) as mapped on the applicable Field Office GIS database; (3) no surface use to seasonally protect Greater Sage-Grouse winter concentration areas in designated Priority Habitat Management Areas (Core only), and outside designated PHMAs (Core only) when supporting wintering Greater Sage-Grouse that attend leks within designated PHMAs (Core only).

### Lease Notices and Stipulations

#### Lease Notice No. 1 – Reasonable Measures to Minimize Adverse Impacts to Resources (applies to all parcels)

Under Regulation 43 CFR 3101.1-2 and terms of the lease (BLM Form 3100-11), the authorized officer may require reasonable measures to minimize adverse impacts to other resource values, land uses, and users not addressed in lease stipulations at the time operations are proposed. Such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures, which may require relocating proposed operations up to 200 meters, but not off the leasehold, and prohibiting surface disturbance activities for up to 60 days.

The lands within this lease may include areas not specifically addressed by lease stipulations that may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Possible special areas are identified below. Any surface use or occupancy within such special areas will be strictly controlled or, if absolutely necessary, prohibited. Appropriate modifications to imposed restrictions will be made for the maintenance and operation of producing wells.

1. Slopes in excess of 25 percent.
2. Within 500 feet of surface water and/or riparian areas.
3. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.
4. Within 500 feet of Interstate highways and 200 feet of other existing rights-of-way (i.e., U.S. and State highways, roads, railroads, pipelines, powerlines).
5. Within 1/4 mile of occupied dwellings.
6. Material sites.

**GUIDANCE:** The intent of this notice is to inform interested parties (potential lessees, permittees, operators) that when one or more of the above conditions exist, surface disturbing activities will be prohibited unless or until the permittee or the designated representative and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development and become a condition for approval when authorizing the action. Specific threshold criteria (e.g., 500 feet from water) have been established based upon the best information available. However, geographical areas and time periods of concern must be delineated at the field level (i.e., "surface water and/or riparian areas" may include both intermittent and ephemeral water sources or may be limited to perennial surface water). The referenced oil and gas leases on these lands are hereby made subject to the stipulation that the exploration or drilling activities will not interfere materially with the use of the area as a materials site/free use permit. At the time operations on the above lands are commenced, notification will be made to the appropriate agency. The name of the appropriate agency may be obtained from the proper BLM Field Office.

Lease Notice No. 2 – National Historic Trails (applies to all parcels)

**BACKGROUND:** The Bureau of Land Management (BLM), by including National Historic Trails within its National Landscape Conservation System, has recognized these trails as national treasures. Our responsibility is to review our strategy for management, protection, and preservation of these trails. The National Historic Trails in Wyoming, which include the Oregon, California, Mormon Pioneer, and Pony Express Trails, as well as the Nez Perce Trail, were designated by Congress through the National Trails System Act (P.L. 90-543; 16 U.S.C. 1241-1251) as amended through P.L. 106-509 dated November 13, 2000. Protection of the National Historic Trails is normally considered under the National Historic Preservation Act (P.L. 89-665; 16 U.S.C. 470 et seq.) as amended through 1992 and the National Trails System Act. Additionally, Executive Order 13195, "Trails for America in the 21st Century," signed January 18, 2001, states in Section 1: "Federal agencies will...protect, connect, promote, and assist trails of all types throughout the United States. This will be accomplished by: (b) Protecting the trail corridors associated with national scenic trails and the high priority potential sites and segments of national historic trails to the degrees necessary to ensure that the values for which each trail was established remain intact." Therefore, the BLM will be considering all impacts and intrusions to the National Historic Trails, their associated historic landscapes, and all associated features, such as trail traces, grave sites, historic encampments, inscriptions, natural features frequently commented on by emigrants in journals, letters and diaries, or any other feature contributing to the historic significance of the trails. Additional National Historic Trails will likely be designated amending the National Trails System Act. When these amendments occur, this notice will apply to those newly designated National Historic Trails as well.

**STRATEGY:** The BLM will proceed in this objective by conducting a viewshed analysis on either side of the designated centerline of the National Historic Trails in Wyoming, except, at this time, for the Nez Perce Trail, for the purpose of identifying and evaluating potential impacts to the trails, their associated historic landscapes, and their associated historic features. Subject to the viewshed analysis and archaeological inventory, reasonable mitigation measures may be applied. These may include, but are not limited to, modification of siting or design of facilities to camouflage or otherwise hide the proposed operations within the viewshed. Additionally, specification of interim and final reclamation measures may require relocating the proposed operations within the leasehold. Surface disturbing activities will be analyzed in accordance with the National Environmental Policy Act of 1969

(P.L. 91-190; 42 U.S.C. 4321-4347) as amended through P.L. 94-52, July 3, 1975 and P.L. 94-83, August 9, 1975, and the National Historic Preservation Act, *supra*, to determine if any design, siting, timing, or reclamation requirements are necessary. This strategy is necessary until the BLM determines that, based on the results of the completed viewshed analysis and archaeological inventory, the existing land use plans (Resource Management Plans) have to be amended. The use of this lease notice is a predecisional action, necessary until final decisions regarding surface disturbing restrictions are made. Final decisions regarding surface disturbing restrictions will take place with full public disclosure and public involvement over the next several years if BLM determines that it is necessary to amend existing land use plans.

**GUIDANCE:** The intent of this notice is to inform interested parties (potential lessees, permittees, operators) that when any oil and gas lease contains remnants of National Historic Trails, or is located within the viewshed of a National Historic Trails' designated centerline, surface disturbing activities will require the lessee, permittee, operator or, their designated representative, and the surface management agency (SMA) to arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development and become a condition for approval when authorizing the action.

#### Lease Notice No. 3 – Greater Sage-Grouse Habitat (applies to all parcels)

**Greater Sage-Grouse Habitat:** The lease may in part, or in total, contain important Greater sage-grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the Greater sage-grouse populations and habitat quality. Such measures shall be developed during the Application for Permit to Drill (APD) on-site and environmental review process and will be consistent with the lease rights granted.

#### Lease Notice 1041 – Water Monitoring Plans

**Lease Notice.** Require water monitoring plans for new activities resulting in surface discharges of water to track changes in receiving channels and to minimize adverse impacts to watershed health. If adverse impacts to receiving channels or watershed health occur, require development and implementation of water management plans which include reclamation strategies and mitigation to address impacts. Avoid BLM-authorized activities and infrastructure such as unlined impoundment ponds/pits, reserve pits, and evaporation ponds that could result in the contamination of sensitive water resources, including Source Water Protection Areas identified in Wellhead or Source Water Protection Plans approved local governing bodies and “High” and “Moderately High” sensitivity aquifer systems identified through the use of the Wyoming Groundwater Vulnerability Assessment Handbook or similar document as updated over time to the maximum extent possible. Where such activities or infrastructure cannot be avoided, apply mitigation to reduce potential impacts on a case-by-case basis.

#### Special Lease Notice – Big Game Migration

**Special Lease Notice:** This parcel is located wholly or partially within a big game migration corridor designated by the State of Wyoming. The lessee or their designated operator will be required to work with the BLM and the State of Wyoming to take reasonable measures (see 43 CFR 3101.1-2) to maintain big game migration corridor functionality pursuant to State of Wyoming Executive Order 2020-1. The BLM will encourage the use of Master Development Plans for operations proposed on this lease parcel in accordance with Onshore Oil and Gas Order No. 1.

#### Special Lease Notice – Unplugged Well Bore

Unplugged wellbore(s) and/or other facilities are located on this parcel. For more information, please contact a Petroleum Engineer at the [insert office name] Field Office at (307) [insert phone number].

#### Lease Stipulation No. 1 – Historic Properties (applies to all parcels)

This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer (SHPO) and tribal consultation) under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such

properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated

Lease Stipulation No. 2 – Endangered Species Act Section 7 Consultation Stipulation (applies to all parcels)

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Lease Stipulation No. 3 – Multiple Mineral Development (applies to all parcels)

Operations will not be approved which, in the opinion of the authorized officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

## **5.5 Parcel Resource Values/Stipulations Summary Table**

HPD 4<sup>th</sup> Quarter 2020 Oil and Gas Lease Sale - Affected Environment Table

Parcel	Field Office	Coal	Cultural Sites/ NHT	Paleo PFYC Class 4 or 5	Recreation	VRM Class I or II	Socio-Economic	Soils	Lands & Realty	Special Management Areas	Fish CSU	Big Game CWR CSU, TLS	Elk Calving CSU, TLS	Sharp-Tailed Grouse CSU, TLS	Raptor Nesting NSO, CSU, TLS & Speical Species Raptor	Bald Eagle Winer Roosts/Nesting NSO, CSU, TLS	Special Status Plant Species CSU, NSO	Greater Sage-Grouse NSO and/or CSU, TLS (in PHMA)	Greater Sage-Grouse NSO and/or CSU, TLS (outside PHMA)	Prairie Dog Colonies CSU	Special Status Species Amphibians, Reptiles, Bats CSU	Vegetation/Riparian	Waters	Existing Wells
WY-204Q-717	NFO		Yes												Yes									
WY-204Q-721	NFO																							
WY-204Q-722	NFO																							
WY-204Q-725	NFO																							
WY-204Q-726	NFO																							
WY-204Q-728	NFO																							
WY-204Q-729	NFO																							
WY-204Q-731	NFO																							
WY-204Q-6894	NFO																							
WY-204Q-6895	NFO																							
WY-204Q-6899	NFO																							
WY-204Q-6901	NFO																							
WY-204Q-6905	NFO																							
WY-204Q-6906	NFO																							
WY-204Q-6907	NFO			Yes											Yes				Yes					

WY-204Q-6908	NFO																							
WY-204Q-6909	NFO																							
WY-204Q-6910	NFO																							
WY-204Q-6911	NFO																							
WY-204Q-6912	NFO																							
WY-204Q-6913	NFO																							
WY-204Q-6914	NFO																							
WY-204Q-717	NFO		Yes											Yes										
WY-204Q-721	NFO																							
WY-204Q-733	CFO		Yes						USFS															
WY-204Q-734	CFO								USFS															
WY-204Q-738	CFO																							
WY-204Q-741	CFO		Yes								Yes			Yes			Yes							
WY-204Q-742	CFO		Yes																					
WY-204Q-743	CFO		Yes														Yes							
WY-204Q-745	CFO																							
WY-204Q-749	CFO		Yes																					
WY-204Q-750	CFO		Yes														Yes							
WY-204Q-758	CFO		Yes																					
WY-204Q-768	CFO																Yes							

WY-204Q-769	CFO																Yes						
WY-204Q-770	CFO																Yes						
WY-204Q-781	CFO																						
WY-204Q-795	CFO		Yes											Yes									
WY-204Q-829	CFO		Yes											Yes									
WY-204Q-830	CFO																						
WY-204Q-831	CFO		Yes											Yes									
WY-204Q-835	CFO		Yes											Yes									
WY-204Q-836	CFO		Yes																				
WY-204Q-6915	CFO								USFS						Yes								
WY-204Q-6917	CFO																						
WY-204Q-6918	CFO													Yes									
WY-204Q-6919	CFO		Yes											Yes			Yes						
WY-204Q-6924	CFO		Yes											Yes			Yes						
WY-204Q-6925	CFO		Yes												Yes								
WY-204Q-6927	CFO		Yes											Yes									
WY-204Q-6928	CFO		Yes														Yes						
WY-204Q-6934	CFO													Yes			Yes						
WY-204Q-6939	CFO																Yes						
WY-204Q-6941	CFO																						

WY-204Q-6945	CFO														Yes									
WY-204Q-6963	CFO		Yes																					
WY-204Q-6965	CFO		Yes																					
WY-204Q-6966	CFO		Yes																					
WY-204Q-6916	BFO			USFS		USFS			USFS						USFS									

WFO Parcels	Split Estate	1041 Water Lease Notice	2038 CSU Occupancy 15M-MLP	2039 Lease Notice Occupancy 15M-MLP	2040 Lease Notice Vehicular Use 15M-MLP	4035 Riparian – Wetland – Playas	4074 TLS BGCWR	4106 w/in 0.6 miles of GSG Lek. Inside PHMA	WY_SW_NSQ_PHMAL	4107 GSG Nesting Inside PHMA	WY_SW_TLS_PHMAL	4107 GSG Nesting w/in 2 miles of Occupied Lek	WY_SW_TLS_GHMAL	4109 PHMA – use DDCT	WY_SW_CSU_PHMA	4118 TLS Active Raptor Nests	4118 CSU Raptor Nests Sites	4148 TLS Fifteenmile HMA Foaling Season	5020 CSU Cultural Setting	5048 CSU VRMI & II
WY-204Q-0757		Yes				Yes	Yes	Yes		Yes			Yes				Yes		Yes	
WY-204Q-0761		Yes				Yes	Yes			Yes			Yes						Yes	
WY-204Q-0762		Yes					Yes			Yes			Yes			Yes	Yes			
WY-204Q-0763		Yes				Yes	Yes					Yes								
WY-204Q-0764		Yes				Yes	Yes			Yes		Yes		Yes		Yes	Yes			
WY-204Q-6931		Yes				Yes	Yes	Yes		Yes				Yes		Yes	Yes		Yes	
WY-204Q-6933		Yes				Yes	Yes													

**HDD - Lease Notices, Timing Limitation Stipulations (TLS), Controlled Surface Use (CSU), and Surface Occupancy (NSO) Stipulations Applied to the Lease Parcels Based on Affected Resources Elements Identified in the Affected Environment Section**

Prelim Parcel # WY- 204Q-	Lease Notice #1, 2, 3	Lease Stip #1, 2, 3	Big Game Crucial Winter Range TLS	GSG DDCT PHMA CSU	GSG/ Sharp-tailed Nesting TLS	B. Owl/ Raptor Nesting TLS	Mountain Plover TLS	Bald Eagle Roost/ Nest TLS or NSO	Greater Sage-Grouse winter concentration area or winter habitat TLS	Big Game Birthing TLS/ CSU	GSG/ Sharp- Tailed Lek NSO/ CSU	Raptor CSU/NSO	Amphib Species CSU	Cult. Res. CSU or NSO	Historic Trails CSU &/or NSO	Adobe Town DRUA CSU	VRM II CSU	Coal/ Trona CSU	SRMA/ SMA/ WHMA CSU or NSO
0767	1,2,3	1,2,3	Applied			Applied													
0774	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied	Applied		Applied							
0775	1,2,3	1,2,3		Applied	Applied				Applied						Applied		Applied		
0776	1,2,3	1,2,3		Applied	Applied				Applied						Applied		Applied		
0777	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied				Applied		Applied		
0778	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied								
0779	1,2,3	1,2,3	Applied	Applied	Applied				Applied	Applied		Applied			Applied				
0788	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied				Applied				
0790	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied								
0791	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied								Applied
0792	1,2,3	1,2,3				Applied						Applied							
0794	1,2,3	1,2,3	Applied	Applied	Applied				Applied								Applied		
0798	1,2,3	1,2,3	Applied	Applied	Applied				Applied										
0799	1,2,3	1,2,3	Applied	Applied	Applied				Applied										
0801	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied				Applied				
0803	1,2,3	1,2,3	Applied	Applied	Applied				Applied						Applied				
0805	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied				Applied				
0806	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied				Applied				
0807	1,2,3	1,2,3	Applied	Applied	Applied				Applied	Applied	Applied				Applied				
0809	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied										
0810	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied								
0812	1,2,3	1,2,3	Applied	Applied	Applied				Applied										
0813	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied	Applied		Applied			Applied				
0814	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied		Applied				Applied				
0815	1,2,3	1,2,3	Applied	Applied	Applied				Applied						Applied				
0816	1,2,3	1,2,3	Applied	Applied	Applied				Applied										
6935	1,2,3	1,2,3	Applied	Applied	Applied				Applied	Applied							Applied		
6936	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied								
6937	1,2,3	1,2,3		Applied	Applied				Applied										
6938	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied		Applied	Applied							
6940	1,2,3	1,2,3		Applied	Applied				Applied	Applied	Applied								
6949	1,2,3	1,2,3	Applied	Applied	Applied				Applied		Applied								
6950	1,2,3	1,2,3	Applied	Applied	Applied				Applied										
6951	1,2,3	1,2,3	Applied	Applied	Applied				Applied						Applied				
6952	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied	Applied					Applied				
6953	1,2,3	1,2,3	Applied	Applied	Applied				Applied						Applied				
6954	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied			Applied							
6955	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied						Applied				
6956	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied	Applied		Applied			Applied				
6957	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied			Applied			Applied				
6958	1,2,3	1,2,3	Applied	Applied	Applied				Applied										
6959	1,2,3	1,2,3	Applied	Applied	Applied	Applied			Applied						Applied				
0755	1,2,3	1,2,3		Applied	Applied				Applied		Applied	Applied	Applied	CSU					Applied
0759	1,2,3	1,2,3	Applied			Applied							Applied	CSU					
0760	1,2,3	1,2,3	Applied			Applied							Applied						
0765	1,2,3	1,2,3	Applied			Applied							Applied						

0766	1,2,3	1,2,3	Applied															
6224	1,2,3	1,2,3	Applied		Applied	Applied	Applied					Applied						
6732	1,2,3	1,2,3	Applied			Applied						Applied	Applied					
6932	1,2,3	1,2,3	Applied										Applied	CSU				
0817	1,2,3	1,2,3	Applied			Applied	Applied	Applied				Applied		NSO	CSU		Applied	
0819	1,2,3	1,2,3	Applied			Applied	Applied	Applied				Applied		NSO	CSU		Applied	
0820	1,2,3	1,2,3	Applied	Applied	Applied	Applied	Applied	Applied	Applied			Applied		CSU	NSO		Applied	SRMA
0821	1,2,3	1,2,3	Applied	Applied	Applied	Applied	Applied	Applied	Applied			Applied		CSU	NSO		Applied	
0823	1,2,3	1,2,3	Applied		Applied	Applied	Applied	Applied				Applied		NSO	CSU		Applied	SRMA
0824	1,2,3	1,2,3	Applied		Applied	Applied	Applied	Applied				Applied		NSO	CSU		Applied	
0825	1,2,3	1,2,3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0827	1,2,3	1,2,3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0828	1,2,3	1,2,3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6879	1,2,3	1,2,3	Applied	Applied	Applied	Applied		Applied	Applied			Applied		CSU			Applied	
6960	1,2,3	1,2,3	Applied			Applied	Applied		Applied			Applied			CSU			
6961	1,2,3	1,2,3	Applied		Applied	Applied	Applied	Applied				Applied			CSU		Applied	SRMA
6962	1,2,3	1,2,3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## **5.6 Air Resources Appendix: Air Quality Related Values: Visibility, Hazardous Air Pollutants and Deposition**

### **5.6.1 Visibility –Wyoming**

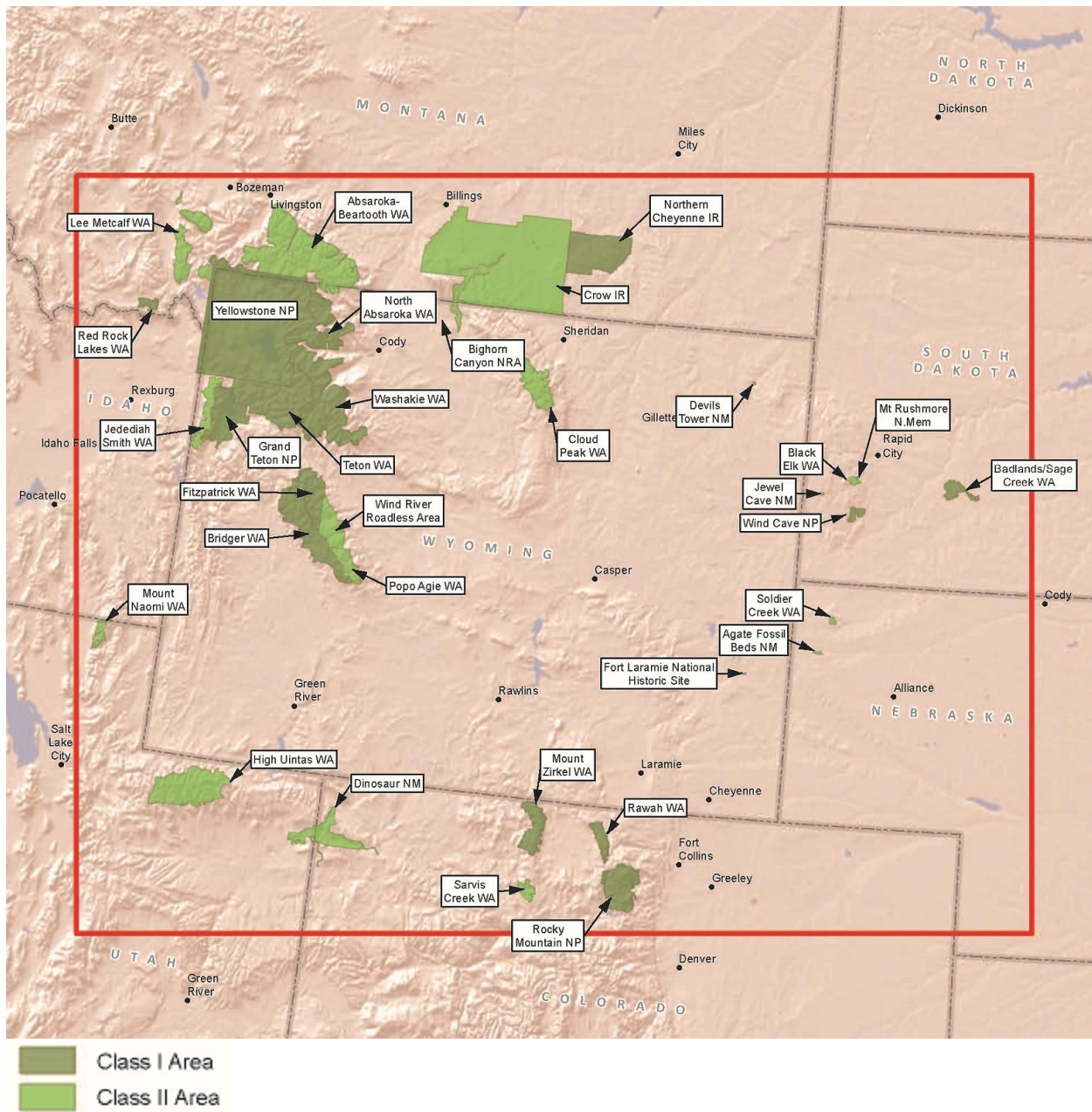
Regional haze is visibility impairment caused by the cumulative air pollutant emissions from numerous sources over a wide geographic area. Visibility impairment is caused by particles and gases in the atmosphere that scatter, distort, or absorb light. The primary cause of regional haze in many parts of the country is light scattering resulting from fine particles (i.e., PM<sub>2.5</sub>) in the atmosphere. Additionally, coarse particles between 2.5 and 10 microns in diameter can contribute to light extinction. Coarse particles and PM<sub>2.5</sub> can be naturally occurring or the result of human activity. The natural levels of these species result in some level of visibility impairment, in the absence of any human influences and will vary with season, daily meteorology, and geography (Malm 1999).

There are several National Parks, National Forests, recreation areas, and wilderness areas within and surrounding the state of Wyoming. National Parks, National Monuments, and some state designated Wilderness Areas are designated as Class I (see figure, below). The Clean Air Act “declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas... from manmade air pollution.” 42 U.S.C. 7491(a)(1). Under BLM Manual Section 8560.36, BLM-administered lands, including wilderness areas not designated as Class I, are managed as Class II, which provides that moderate deterioration of air quality associated with industrial and population growth may occur.

The Interagency Monitoring of Protected Visual Environments (IMPROVE) program was initiated in 1985. This program implemented an extensive long term monitoring program to establish the current visibility conditions, track changes in visibility and determine causal mechanism for the visibility impairment in the National Parks and Wilderness Areas. Observations over time have shown that visibility is not as good as it could be compared to natural background conditions (i.e., visibility is impaired relative to natural background conditions). In 1999, the EPA issued a Regional Haze Rule to protect visibility in over 150 national parks and wilderness areas. The Regional Haze Rule requires states to establish Reasonable Progress Goals for improving visibility, with the overall goal of attaining natural background visibility conditions by 2064.

The Clean Air Act includes “as a National Goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas in which impairment results from manmade air pollution.” The CAA gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation. A wide variety of pollutants can impact visibility, including PM, NO<sub>2</sub>, NO<sub>3</sub>, and SO<sub>4</sub>. Fine particles suspended in the atmosphere decrease visibility by blocking, reflecting, or absorbing light. Regional haze occurs when pollutants from widespread emission sources become mixed in the atmosphere and travel long distances.

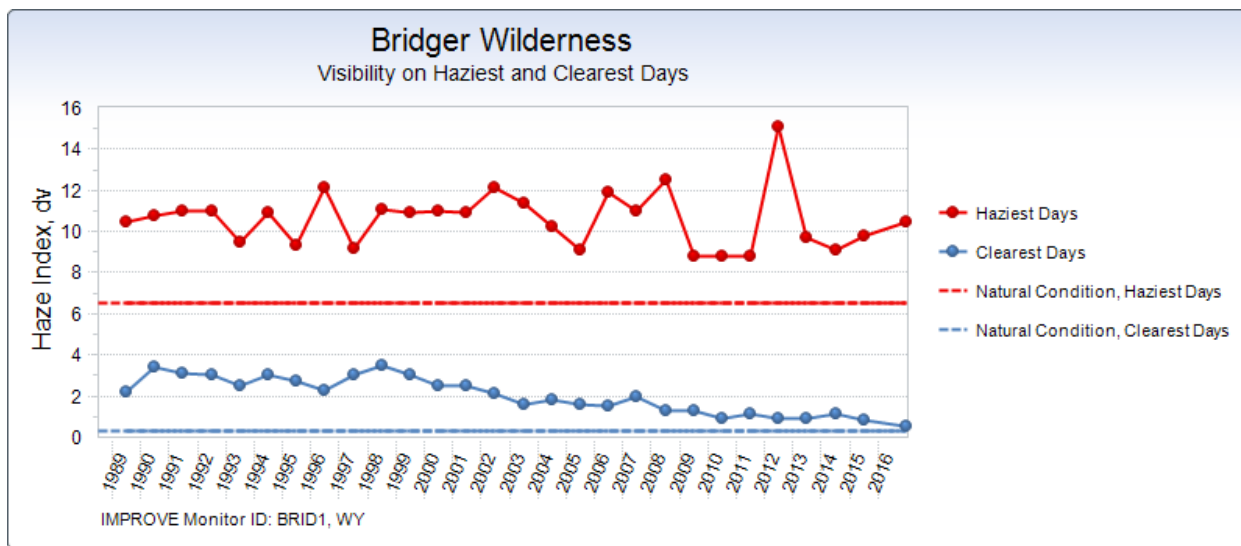
National Parks, Wilderness Areas, and National Parks



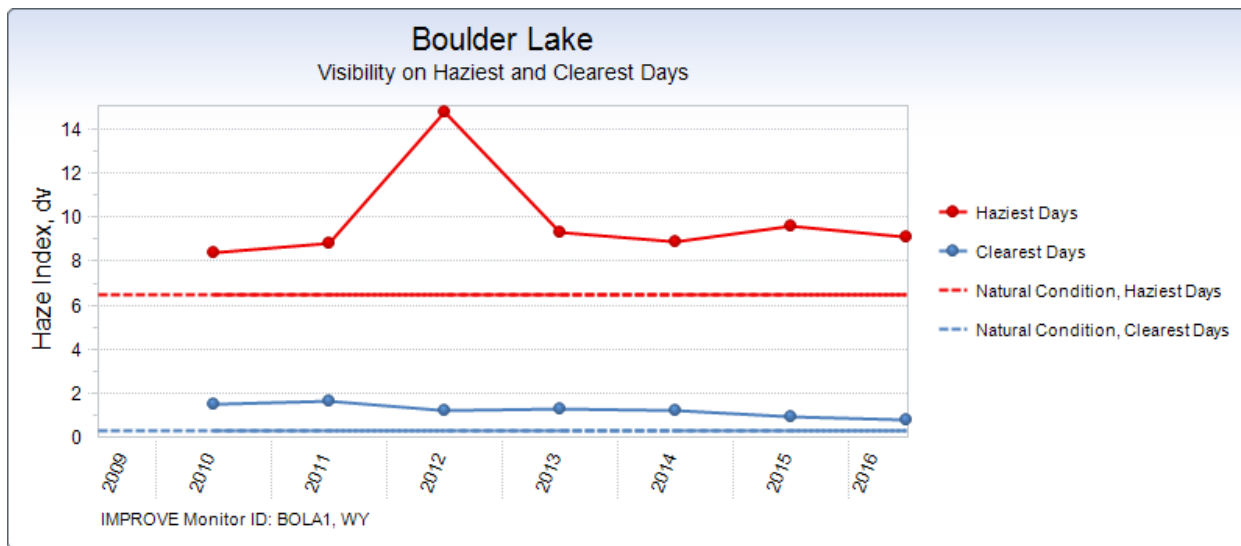
Visibility is expressed as deciviews (dv), which is a measure for describing perceived changes in visibility. Deciview values are calculated from either measured or estimated light extinction values in units of inverse megameters ( $Mm^{-1}$ ). A dv value of zero indicates a pristine atmosphere.

The figures below display annual average visibility in deciviews for the 20 percent best days, 20 percent worst days, and all days for each year during the late 20<sup>th</sup> and early 21<sup>st</sup> Century for the following IMPROVE sites: Bridger Wilderness, Boulder Lake, North Absaroka, Thunder Basin, Wind Cave, and Cloud Peak. Note: the 2017 IMPROVE data was not available, and the monitoring at Cloud Peak stopped in 2014. Generally, the IMPROVE data show a slow increase in visibility on the “Clearest Days” and a near-neutral trend in visibility for the “Haziest Days.”

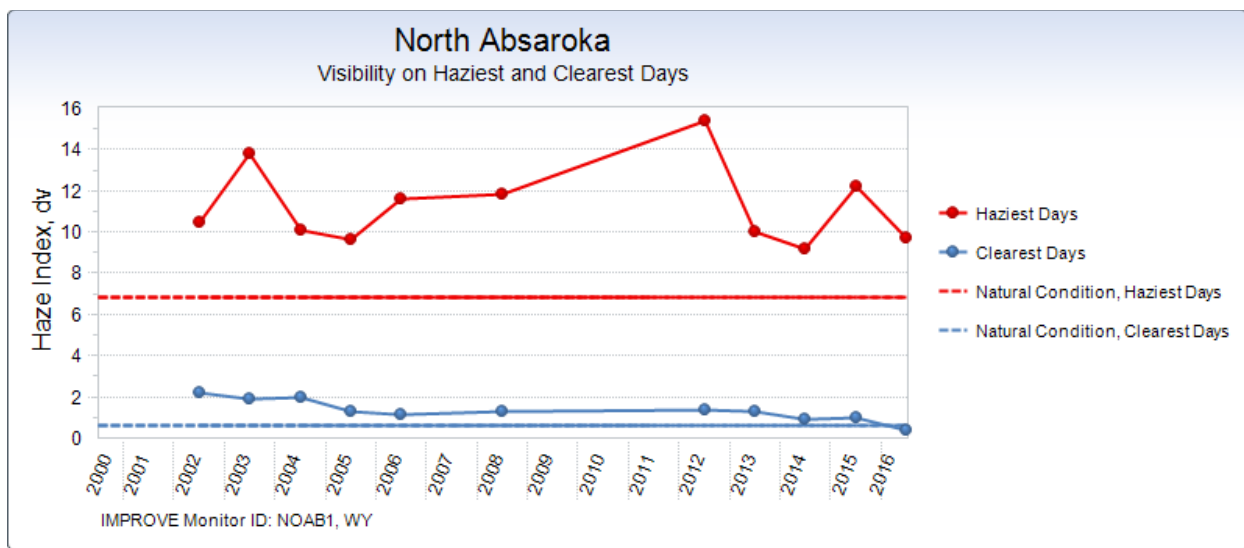
Annual Average Visibility (deciviews) for the Bridger Wilderness IMPROVE Site (1989-2016).



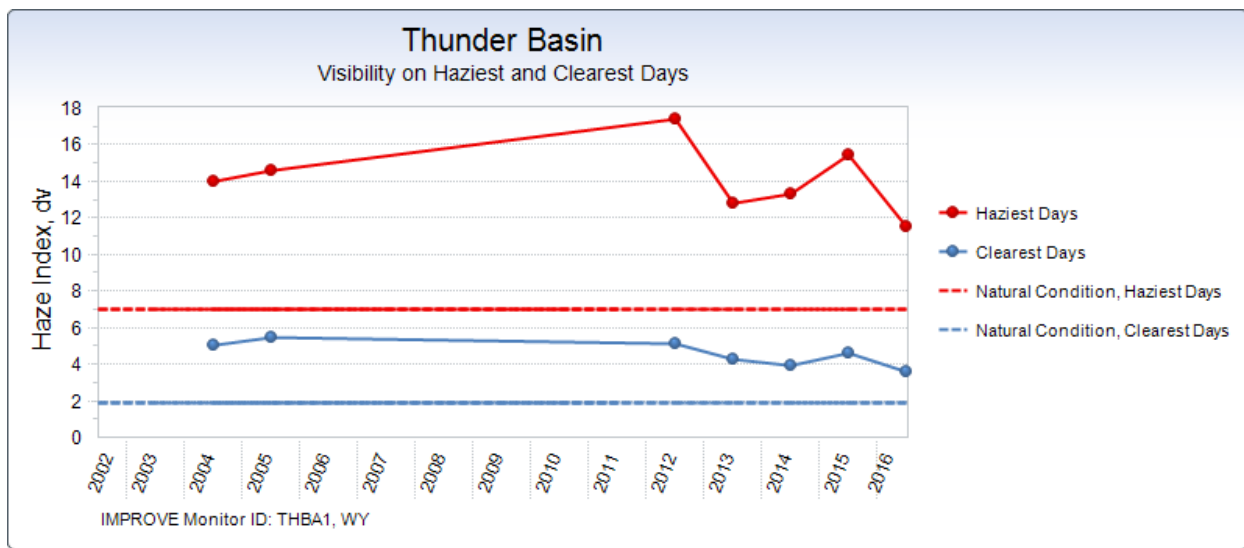
Annual Average Visibility (deciviews) for the Boulder Lake IMPROVE Site (2010-2016).



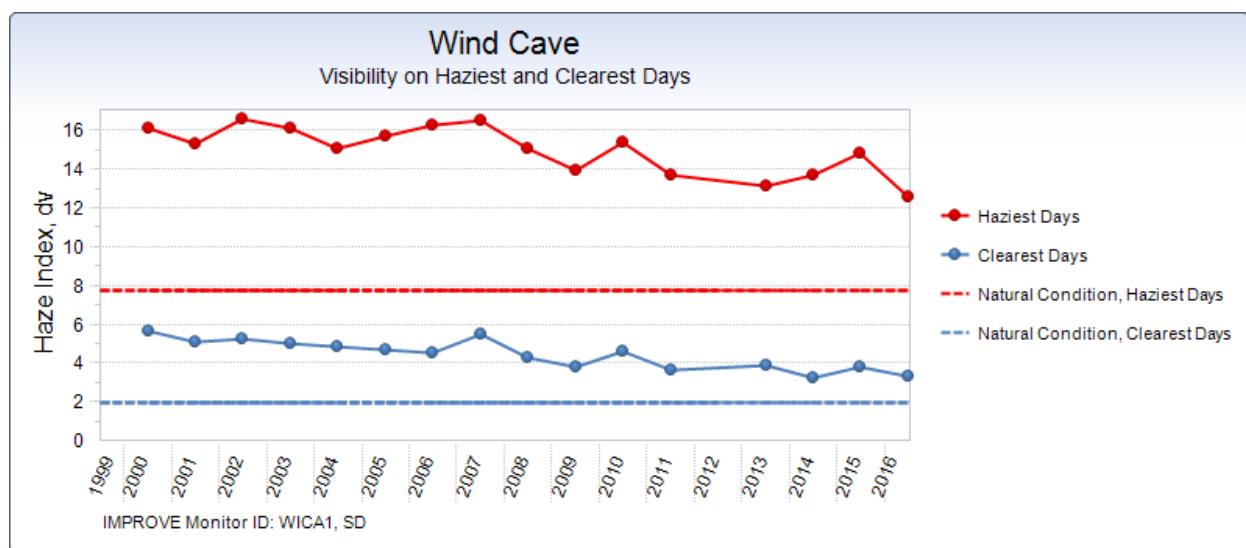
Annual Average Visibility (deciviews) for the North Absaroka IMPROVE Site (2002-2016).



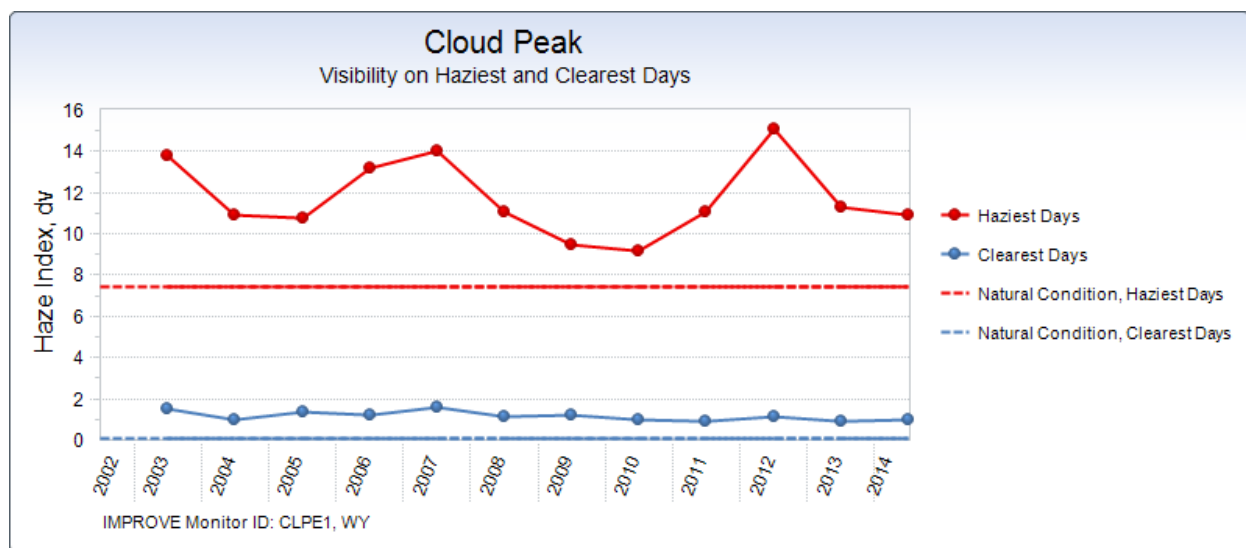
Annual Average Visibility (deciviews) for the ThunderBasin IMPROVE Site (2004,2005,2012-2016).



Annual Average Visibility (deciviews) for the Wind Cave, SD IMPROVE Site (1999-2016).



Annual Average Visibility (deciviews) for the Cloud Peak IMPROVE Site (2003-2014).



Source: Federal Land Manager Environmental Database 2018

(<http://views.cira.colostate.edu/fed/AgrvMenu.aspx>), accessed on 5/8/2018.

IMPROVE background reference: <http://vista.cira.colostate.edu/Improve/improve-program/>

## 5.6.2 Hazardous Air Pollutants (HAPs)-High Desert District

Many VOCs are HAPs, and are associated with human-made sources. The 2008 and 2011 National Emission Inventories and later WDEQ emissions inventories, indicate that VOC emissions within the region are primarily from area sources associated with oil and gas development activities. Therefore, HAP concentrations are expected to be greatest near oil and gas development sources and are a potential air quality concern for the region.

HAPs are not routinely monitored within the State of WY except where VOC production is a concern due to non-attainment. Because of the ongoing air quality concerns in the HDD, WDEQ conducted HAP monitoring for several sites in the HDD from February 2009 until March 2010. **Error! Reference source not found.**10 summarizes

observed HAP concentrations for the Boulder, Daniel South, and Pinedale monitoring sites. Measurements were taken every six days and the values represent averages for the entire monitoring period.

Table: Example HAP Concentrations (micrograms per cubic meter) for Sublette County, Wyoming

Site Name	Annual Average HAP Concentration ( $\mu\text{g}/\text{m}^3$ )					
	<i>Benzen e</i>	<i>Ethyl- benzene</i>	<i>Formalde -hyde</i>	<i>Hexane</i>	<i>Toluene</i>	<i>Xylene</i>
Boulder	2.12	0.77	0.99	1.29	6.42	4.46
Daniel South	1.25	0.52	1.37	0.81	4.30	2.76
Pinedale	2.13	1.00	1.59	1.47	6.50	6.38

Source: REF 1020

$\mu\text{g}/\text{m}^3$  micrograms per cubic meter

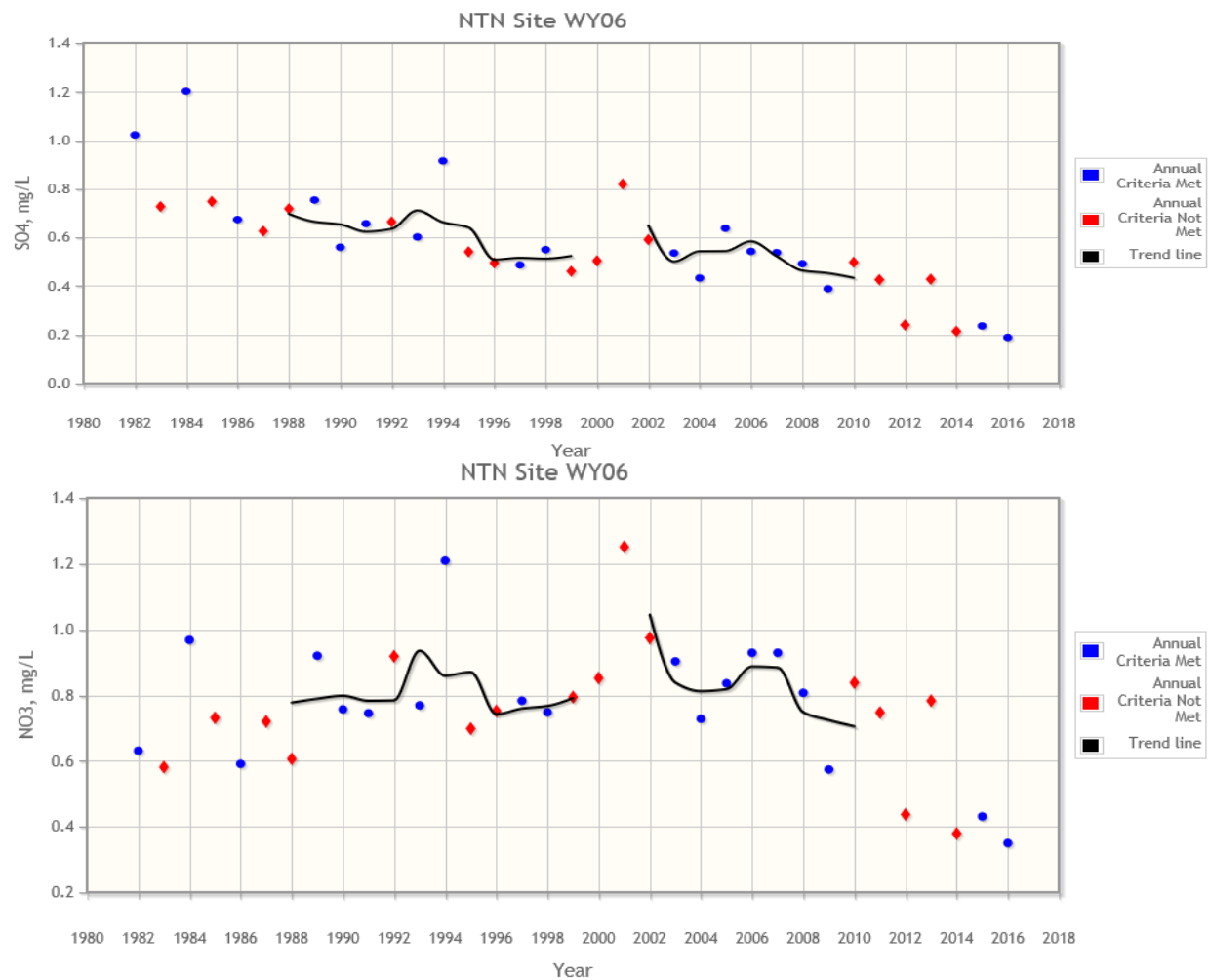
### 5.6.3 Deposition and Lake Chemistry – Wyoming

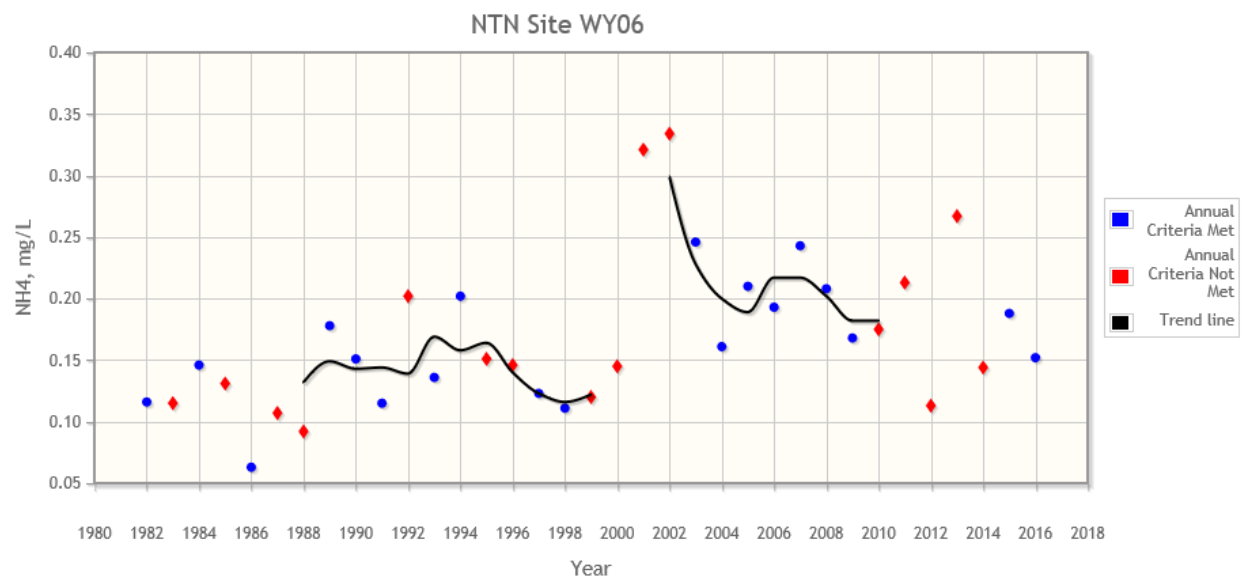
Sulfur and nitrogen compounds that can be deposited on terrestrial and aquatic ecosystems include nitric acid ( $\text{HNO}_3$ ), nitrate ( $\text{NO}_3^-$ ), ammonium ( $\text{NH}_4^+$ ), and sulfate ( $\text{SO}_4^{--}$ ). Nitric acid ( $\text{HNO}_3$ ) and nitrate ( $\text{NO}_3^-$ ) are not emitted directly into the air, but form in the atmosphere from industrial and automotive emissions of nitrogen oxides ( $\text{NO}_x$ ); and sulfate ( $\text{SO}_4^{--}$ ) is formed in the atmosphere from industrial emission of sulfur dioxide ( $\text{SO}_2$ ). Deposition of  $\text{HNO}_3$ ,  $\text{NO}_3^-$  and  $\text{SO}_4^{--}$  can adversely affect plant growth, soil chemistry, lichens, aquatic environments, and petroglyphs (ancient carvings and/or engravings on rock surfaces). Ammonium ( $\text{NH}_4^+$ ) is volatilized from animal feedlots and from soils following fertilization of crops.

Wet atmospheric deposition is measured at National Atmospheric Deposition Program (NADP) sites: Pinedale, Sink's Canyon, South Pass, Newcastle, and Wind Cave. Dry deposition is measured at three Clean Air Status and Trends Network (CASTNET) sites in Pinedale (Sublette County), Newcastle (Weston County), and Basin (Big Horn County). Wet deposition is characterized by the concentration of nitrate ion ( $\text{NO}_3^-$ ), sulfate ion ( $\text{SO}_4^-$ ), and ammonium ( $\text{NH}_4^+$ ) ions in precipitation samples. The figures below display annual average concentration data for nitrate, sulfate, and ammonium ions from precipitation samples for each year during the period from the late 20<sup>th</sup> to early 21<sup>st</sup> Century Wyoming and South Dakota NADP sites. For each year, the data represent the average concentration based on all sampling periods. Units are milligrams per liter (mg/L). The data indicate a decrease in sulfate and nitrate ions for all NADP sites in precipitation samples. However, concentrations for the ammonium ion are either steady or slowly increasing at sites.

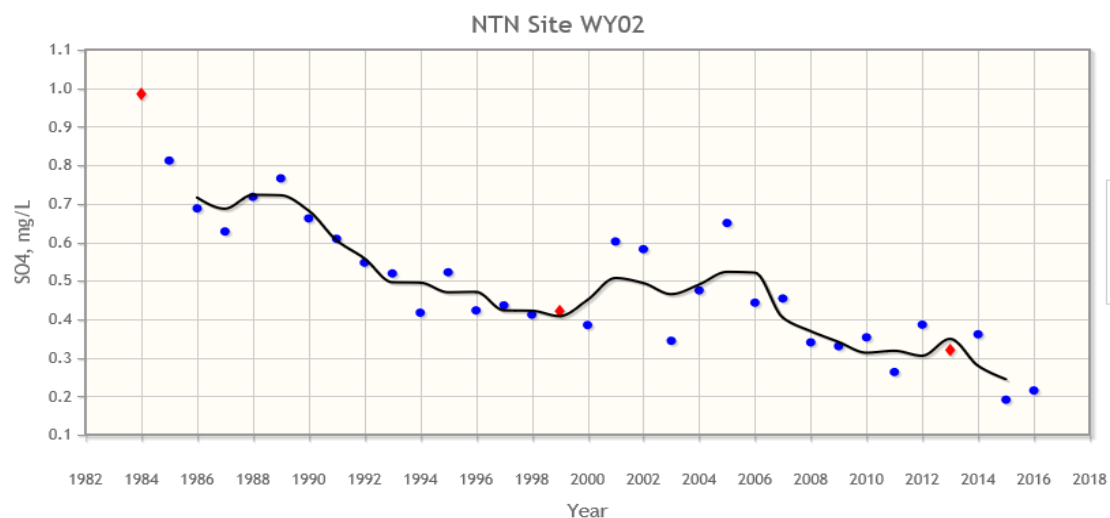
The figures below display annual average concentration data for Sulfur Dioxide, Particulate Sulfate, Particulate Nitric Acid, Total Nitrate, and Particulate Ammonium for the three Wyoming CASTNET sites. The concentration measurements are used to estimate dry deposition. For each year, the data represent the average concentration based on all sampling periods. Units are  $\mu\text{g}/\text{m}^3$ . The concentration data indicate a decrease for all pollutant species at Pinedale and Newcastle. However, the Basin concentrations increase from 2016 to 2017.

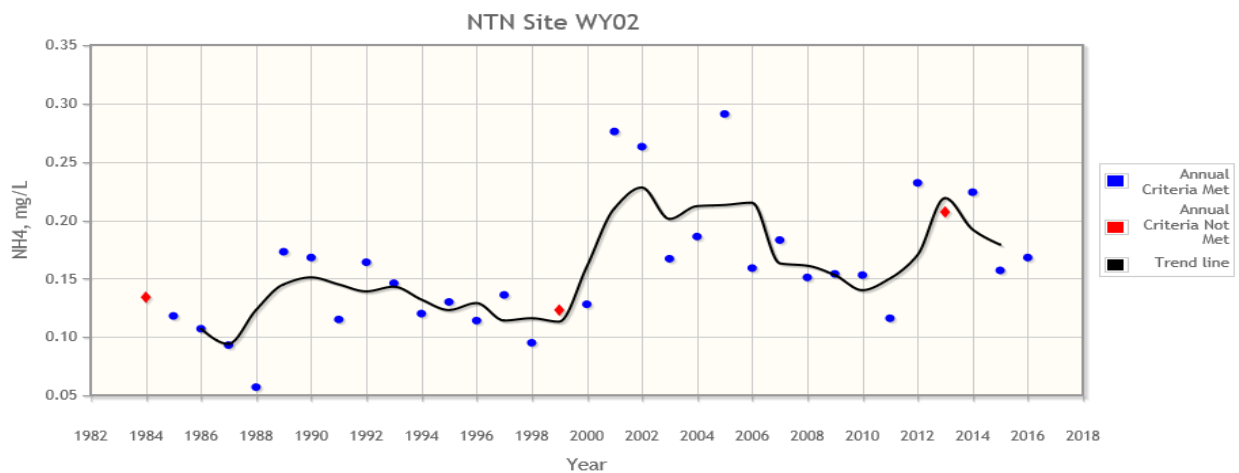
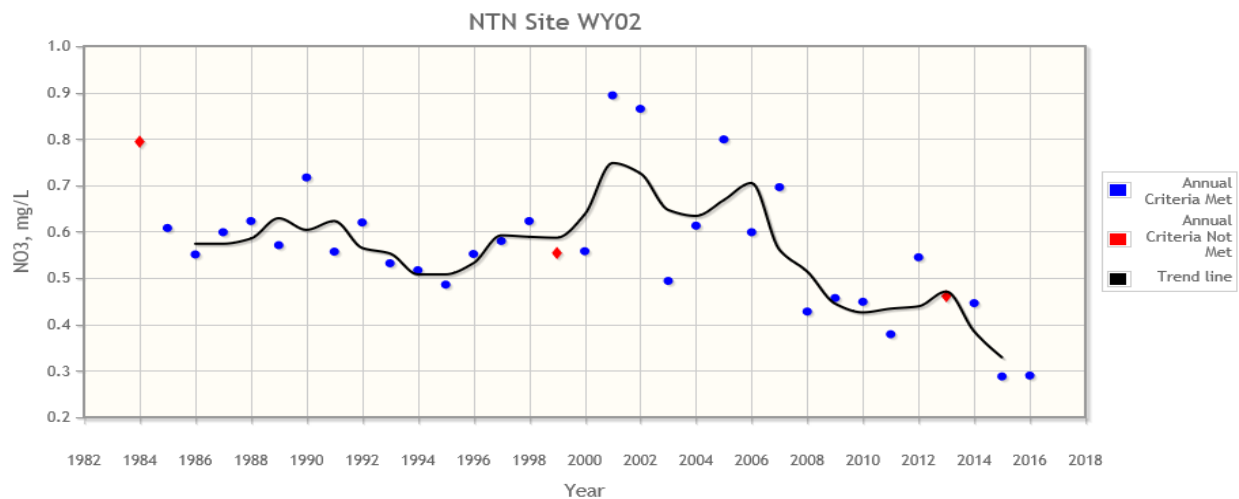
Annual Average Concentration in Wet Deposition (milligrams per liter) for NADP Monitoring Site at Pinedale



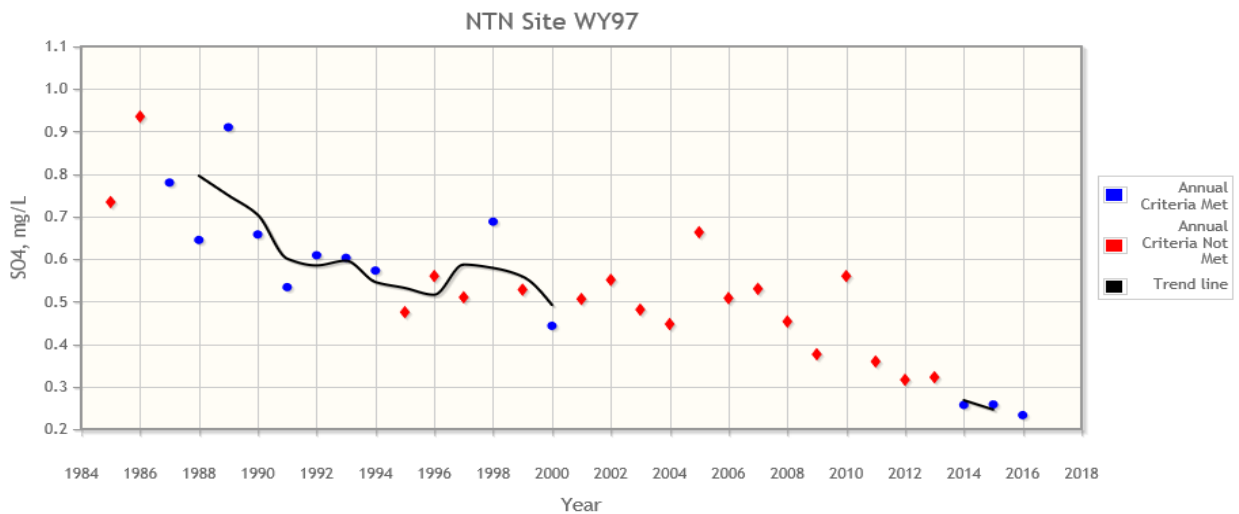


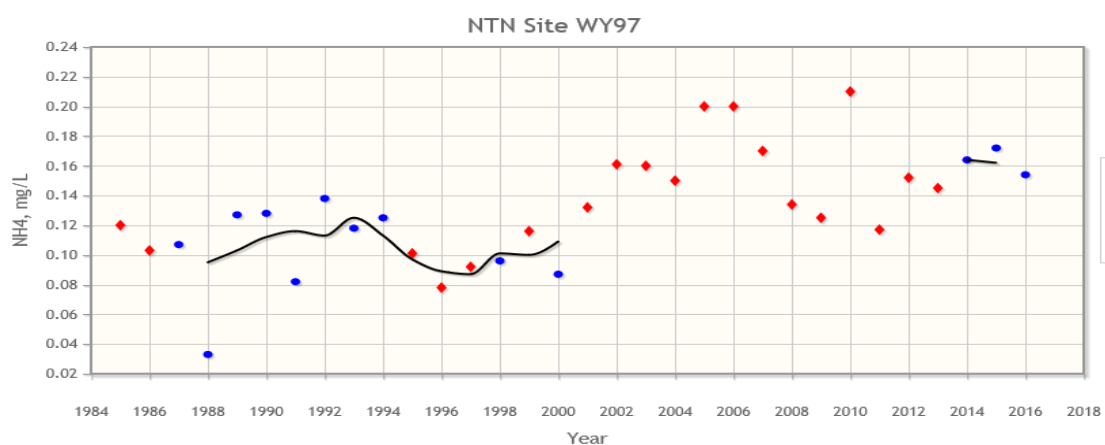
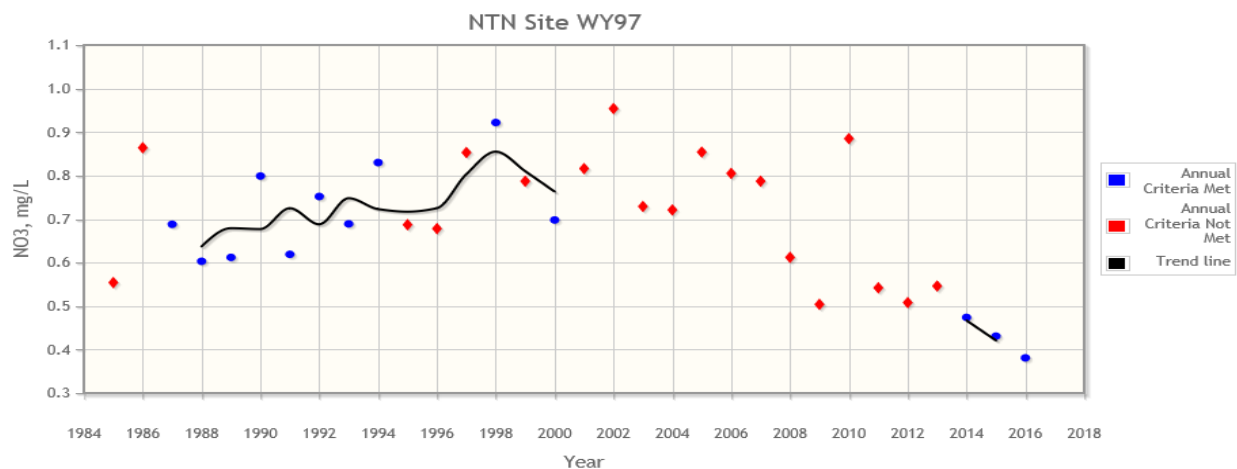
Annual Average Concentration in Wet Deposition (milligrams per liter) for NADP Monitoring Site at Sink's Canyon.



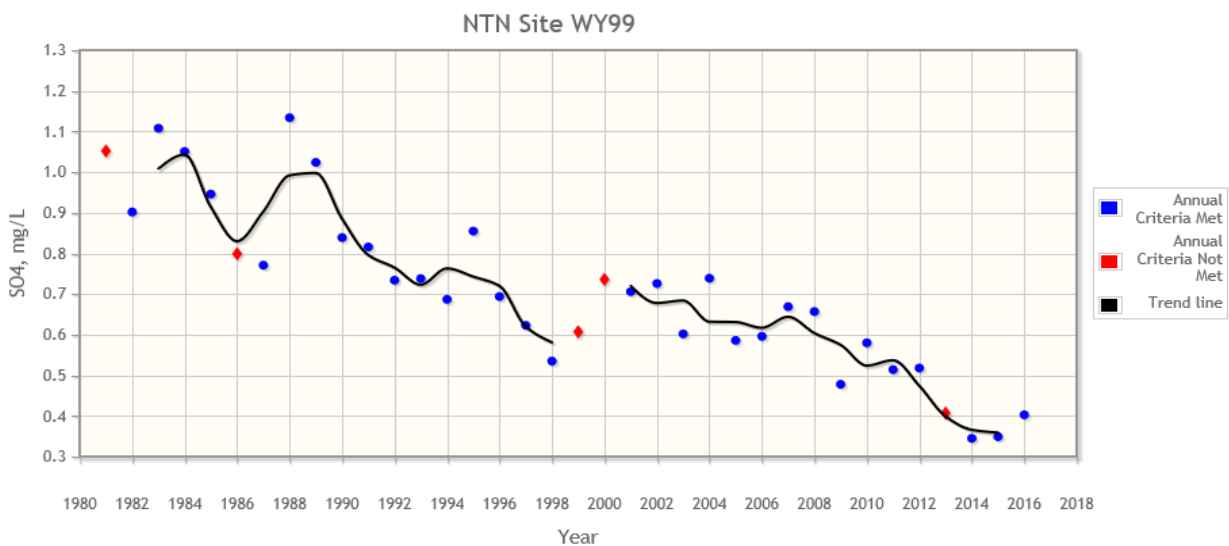


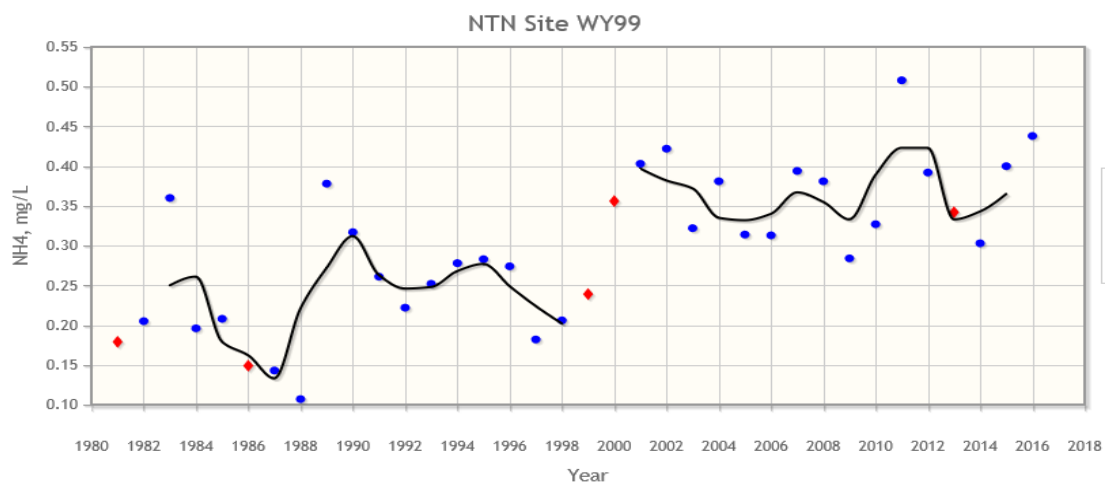
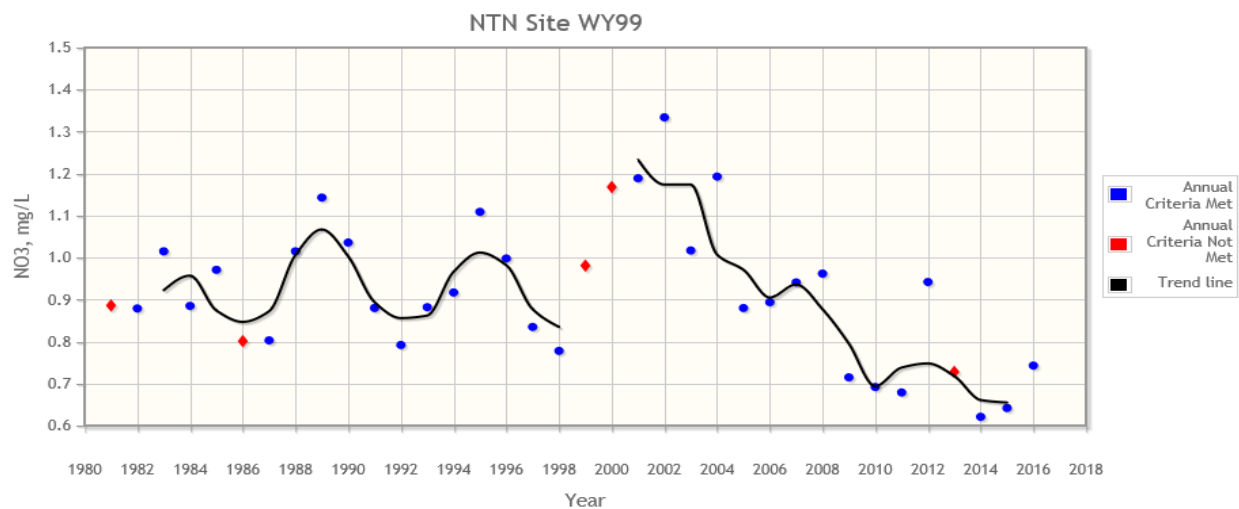
Annual Average Concentration in Wet Deposition (milligrams per liter) for NADP Monitoring Site at South Pass.



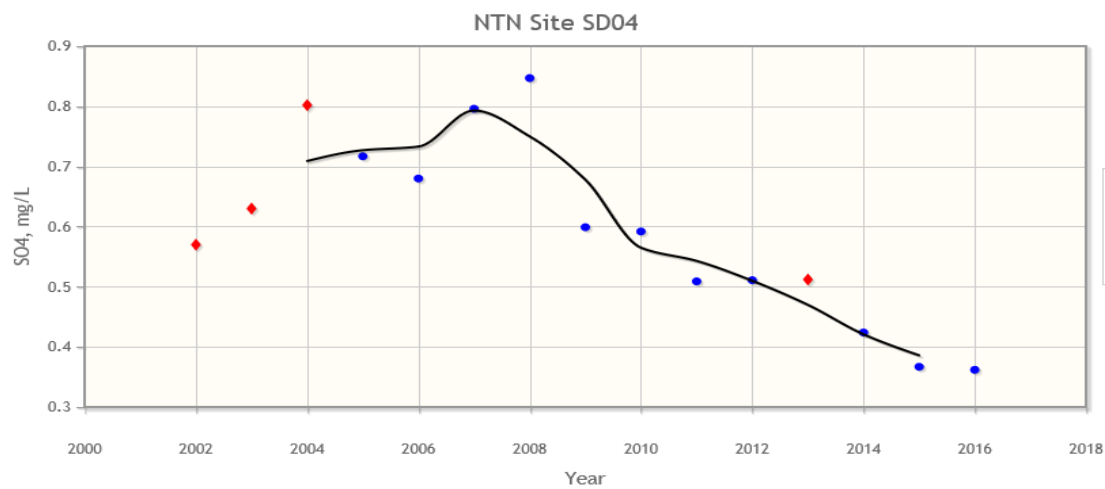


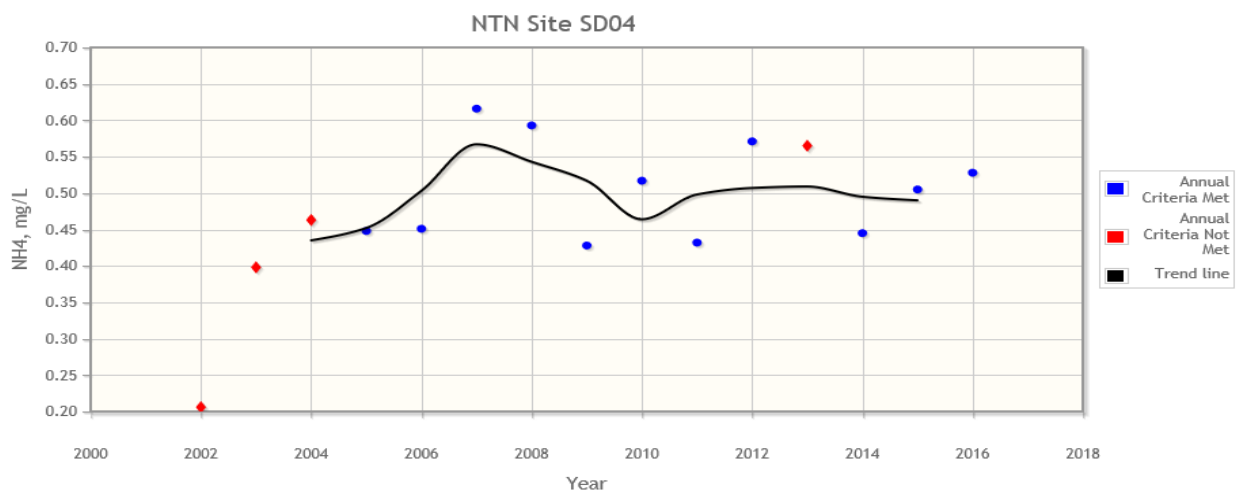
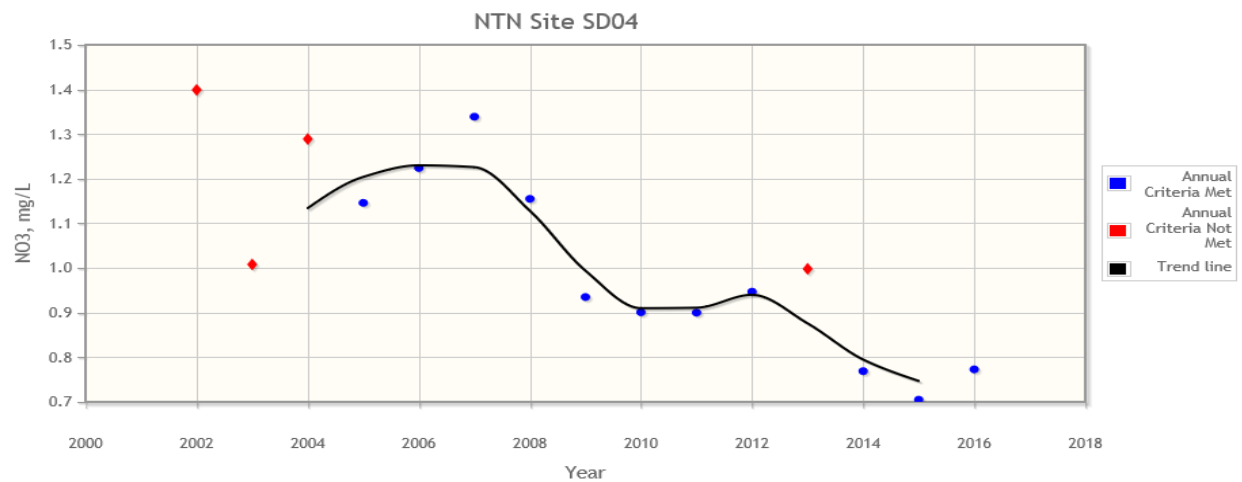
Annual Average Concentration in Wet Deposition (milligrams per liter) for NADP Monitoring Site at Newcastle.





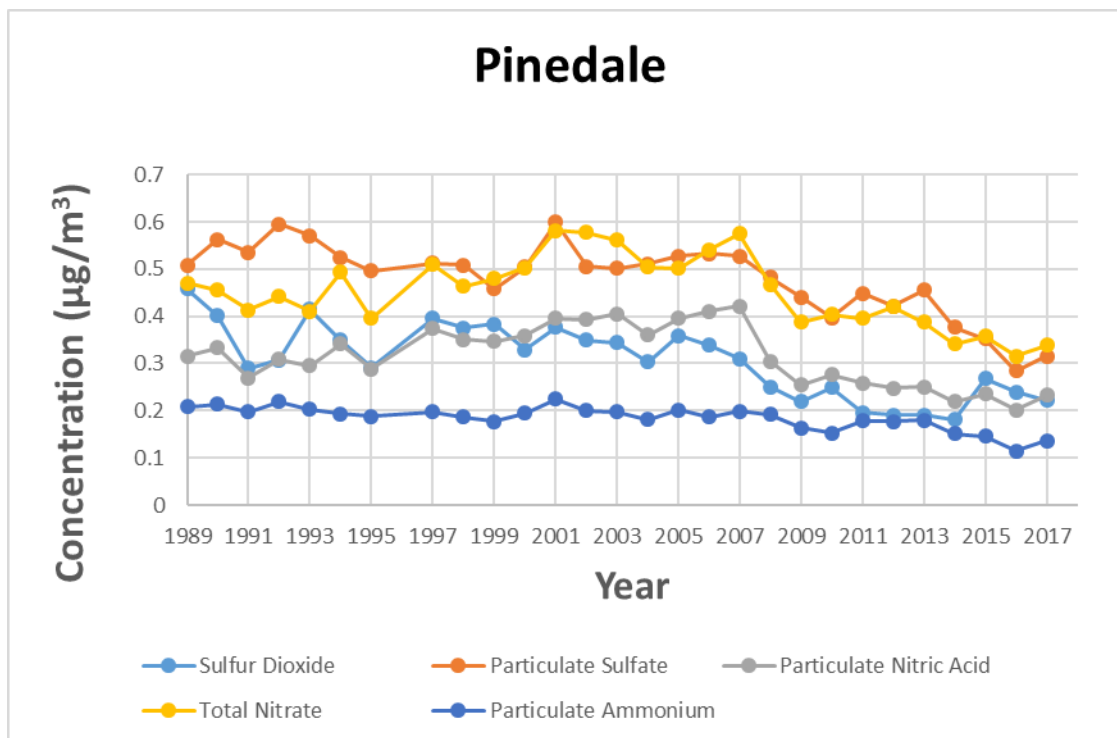
Annual Average Concentration in Wet Deposition (milligrams per liter) for NADP Monitoring Site at Wind Cave, SD.



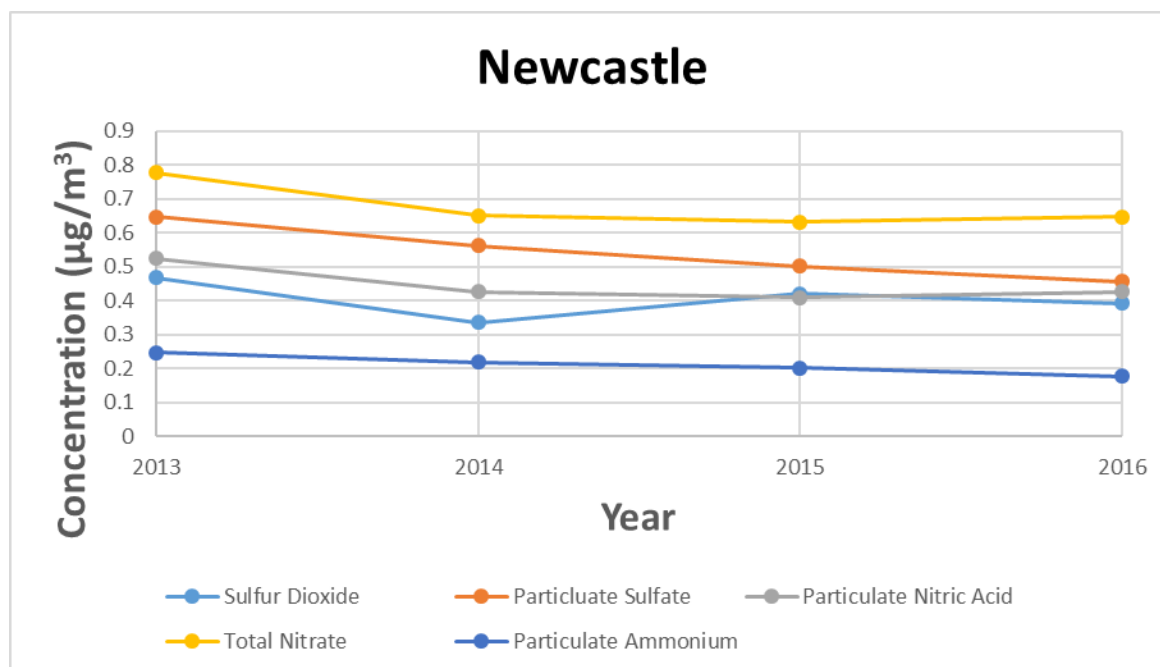


Source: REF 1014

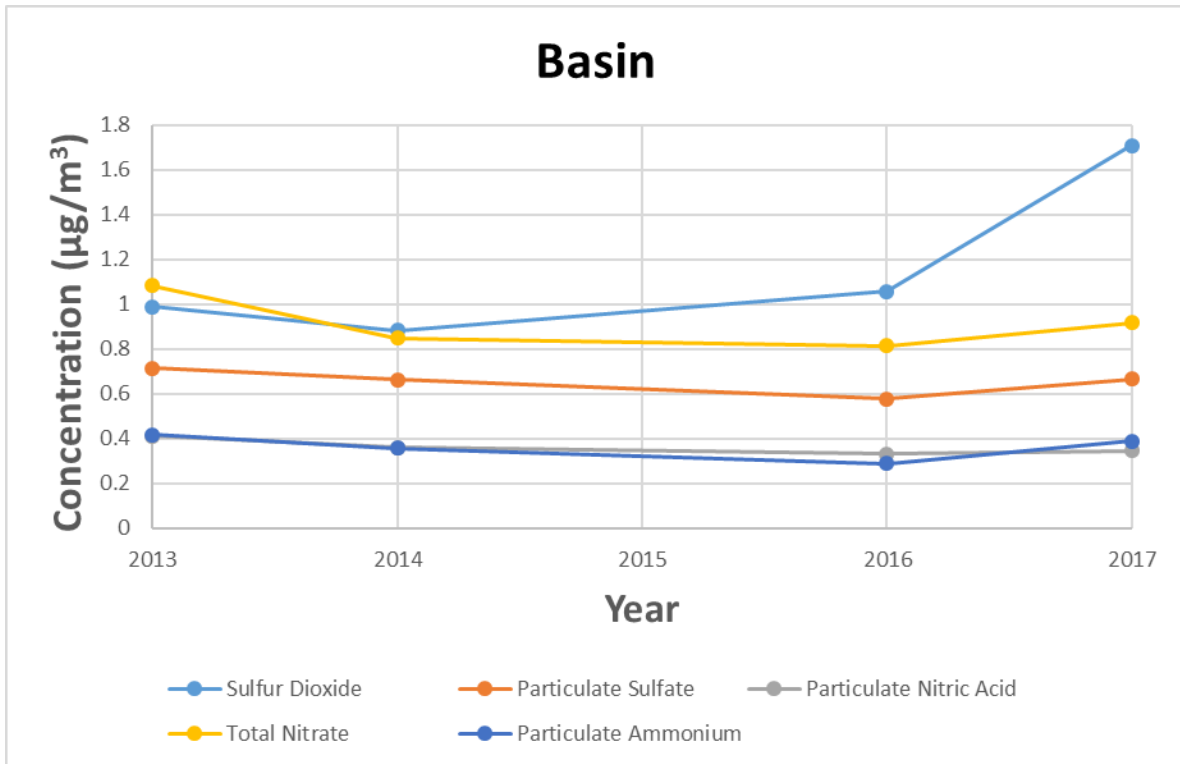
Annual Average Concentration in Dry Deposition (micrograms per cubic meter) for the CASTNET Monitoring Site at Pinedale.



Annual Average Concentration in Dry Deposition (micrograms per cubic meter) for the CASTNET Monitoring Site at Newcastle.



Annual Average Concentration in Dry Deposition (micrograms per cubic meter) for the CASTNET Monitoring Site at Basin.



Source: REF 1014

Seven lakes have been identified as being acid sensitive. Applicable thresholds for the assessment of changes in acid neutralizing capacity (ANC) of sensitive lakes include: 10 percent change in ANC for lakes with background ANC values greater than 25 micro equivalents per liter [ $\mu\text{eq/L}$ ], and less than a 1  $\mu\text{eq/L}$  change in ANC for lakes with background ANC values equal to or less than 25  $\mu\text{eq/L}$ .

Available ANC values for each of the nearest sensitive lakes are provided in the table, below, along with the number of samples used in the calculation of the 10<sup>th</sup> percentile lowest ANC values. Of the seven lakes listed in the table, below, only Upper Frozen Lake is considered to be extremely sensitive to atmospheric deposition by the USFS since the background ANC is less than 25  $\mu\text{eq/L}$ .

Table: Background ANC Values for Acid Sensitive Lakes

Wilderness Area	Lake	Latitude (Deg, Min, Sec)	Longitude (Deg, Min, Sec)	10 <sup>th</sup> Percentile Lowest ANC Value (µeq/l)	Number of Samples
Bridger	Deep	42°43'10"	109°10'15"	57.7	68
Bridger	Black Joe	42°44'22"	109°10'16"	62.6	78
Bridger	Lazy Boy	43°19'57"	109°43'47"	9.1	5
Bridger	Upper Frozen	42°41'13"	109°09'39"	7.5	12
Bridger	Hobbs	43°02'08"	109°40'20"	69.9	80
Fitzpatrick	Ross	43°23'35"	109°39'29"	53.0	61
Popo Agie	Lower Saddlebag	42°37'24"	108°59'42"	54.6	64
Cloud Peak	Florence Lake	44°20'53"	107°10'50"	70	40
Cloud Peak	Emerald Lake	44°27'26"	107°18'11"	34.4	42

Sources: Source: USFS 2011 and Views (2014b)

ANC Acid Neutralizing Capacity

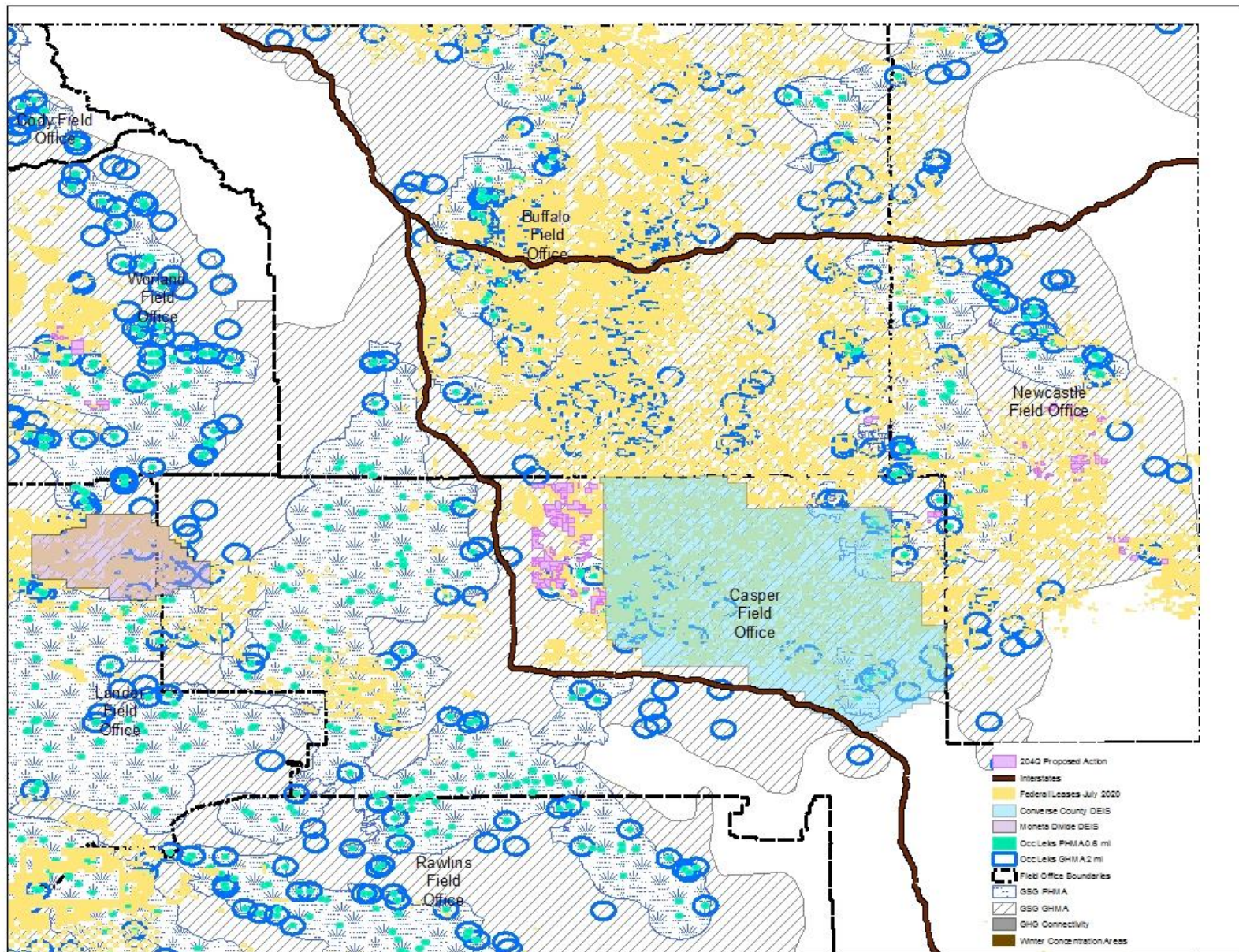
Deg Degree

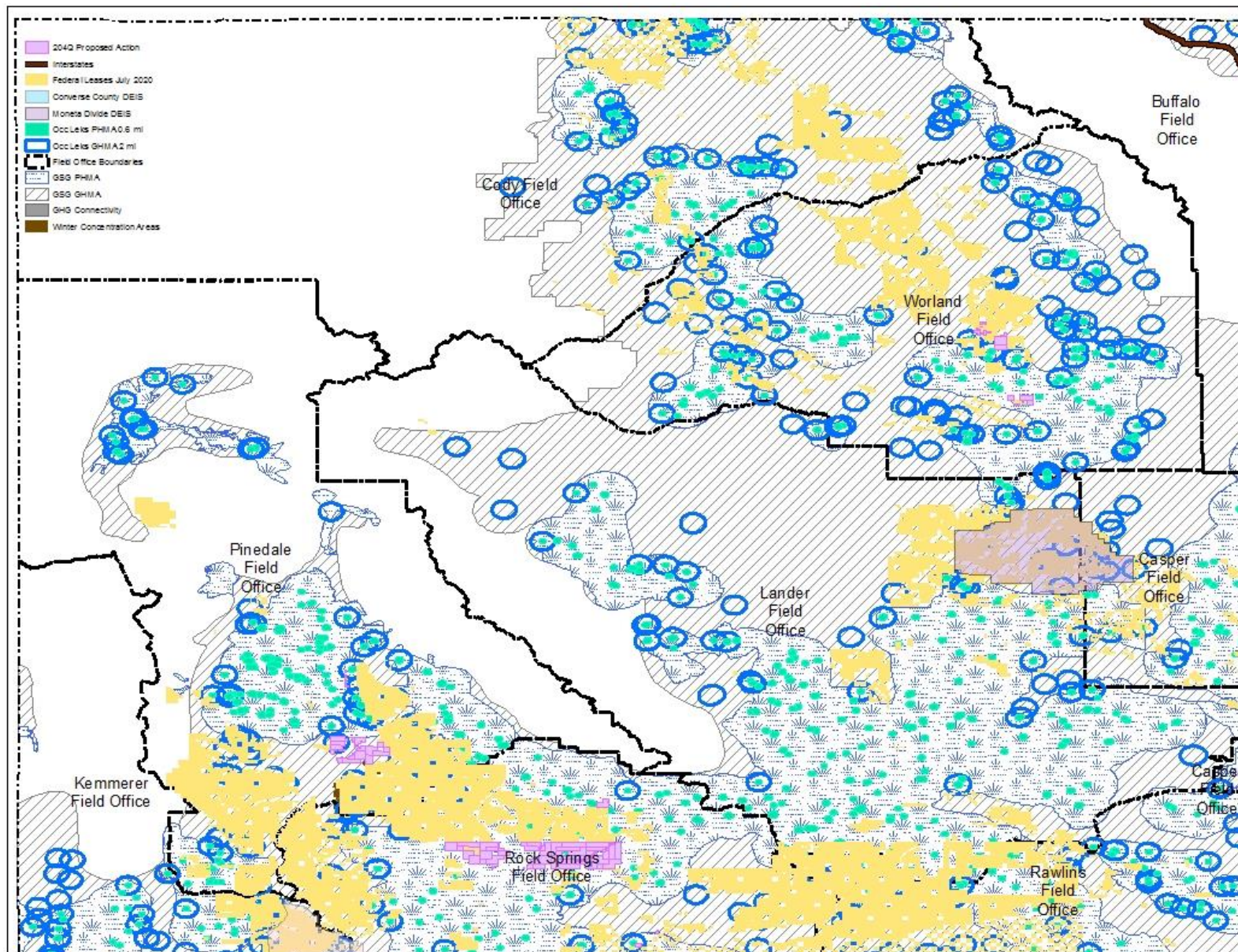
Min Minute

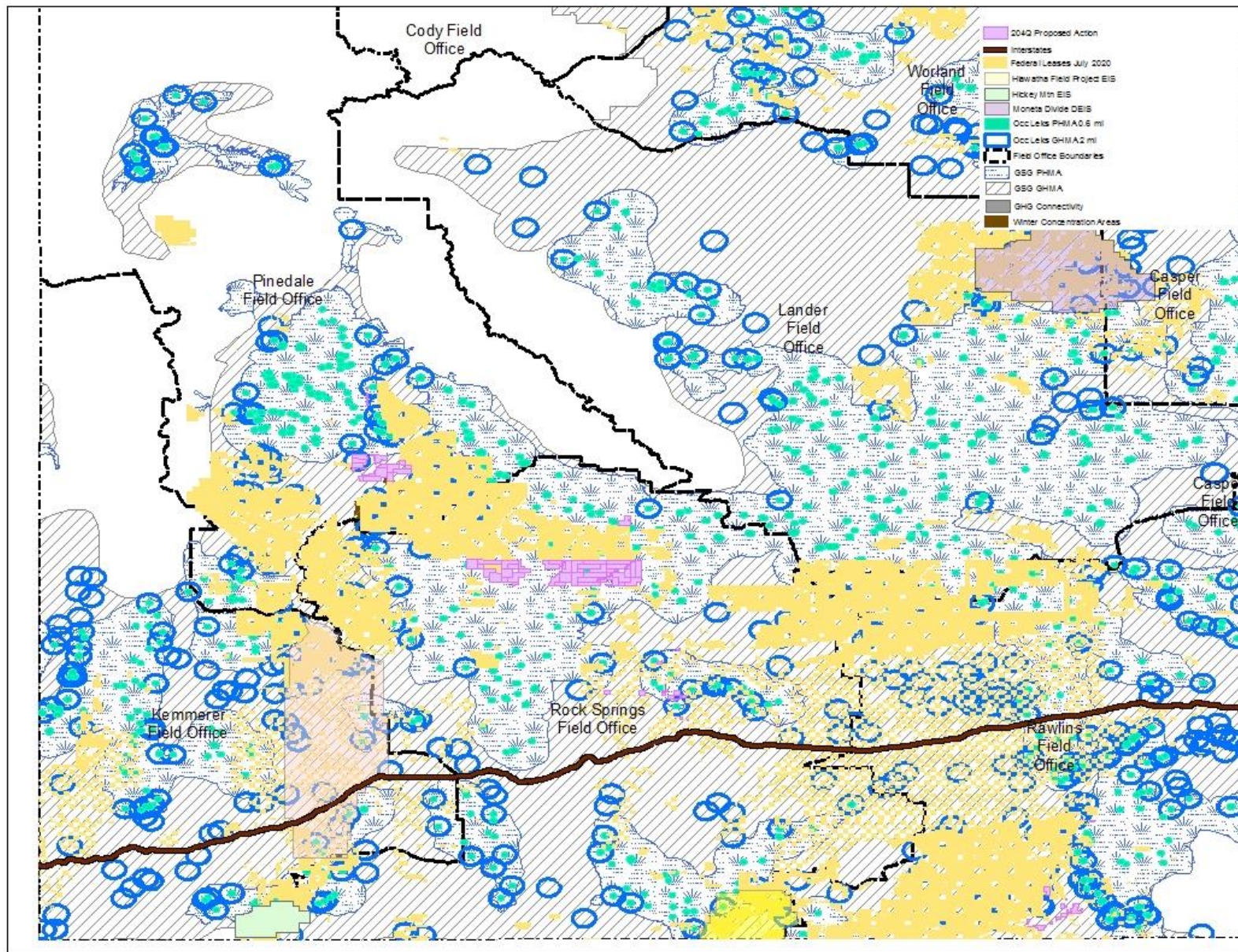
Sec Second

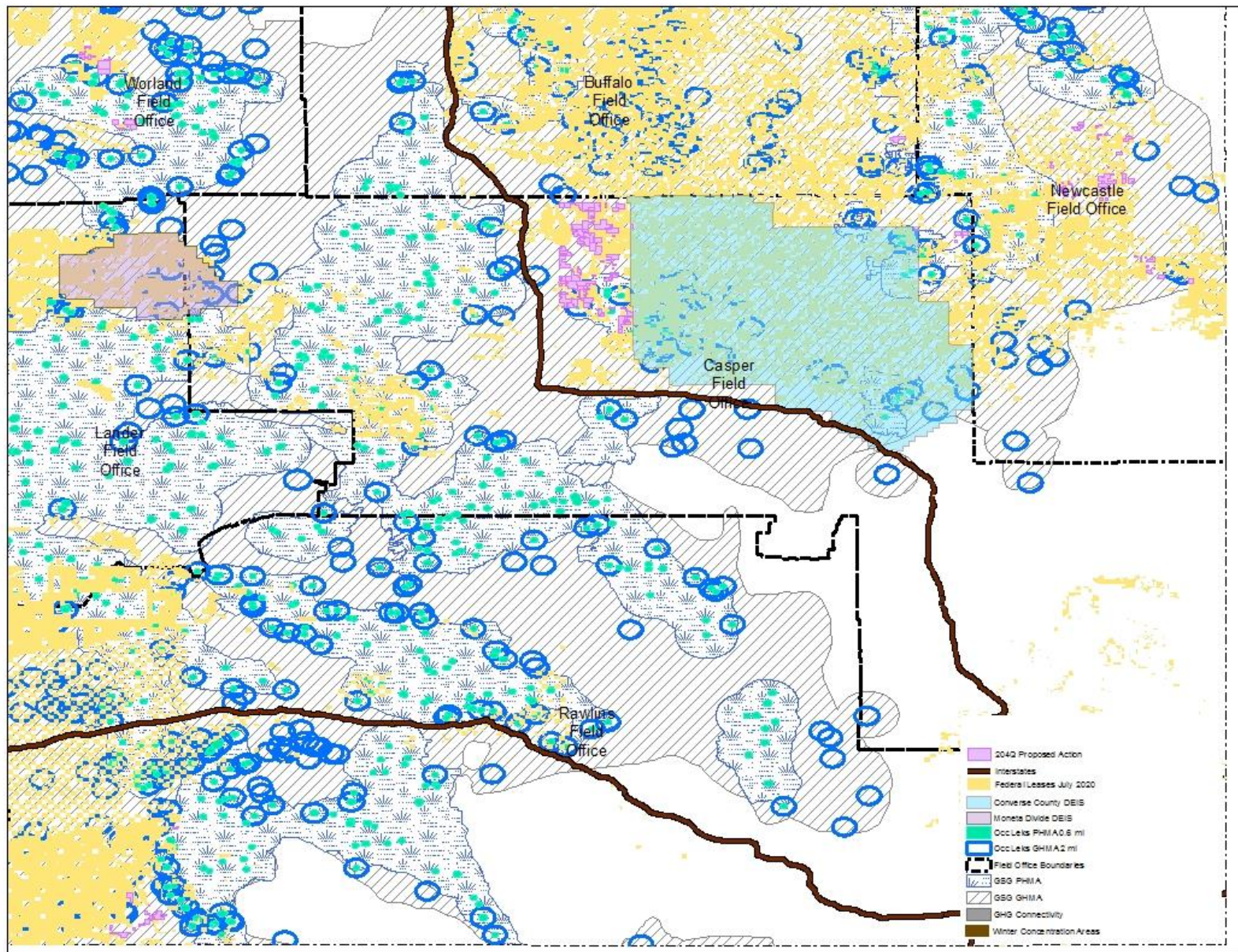
µeq/l Microequivalent per liter

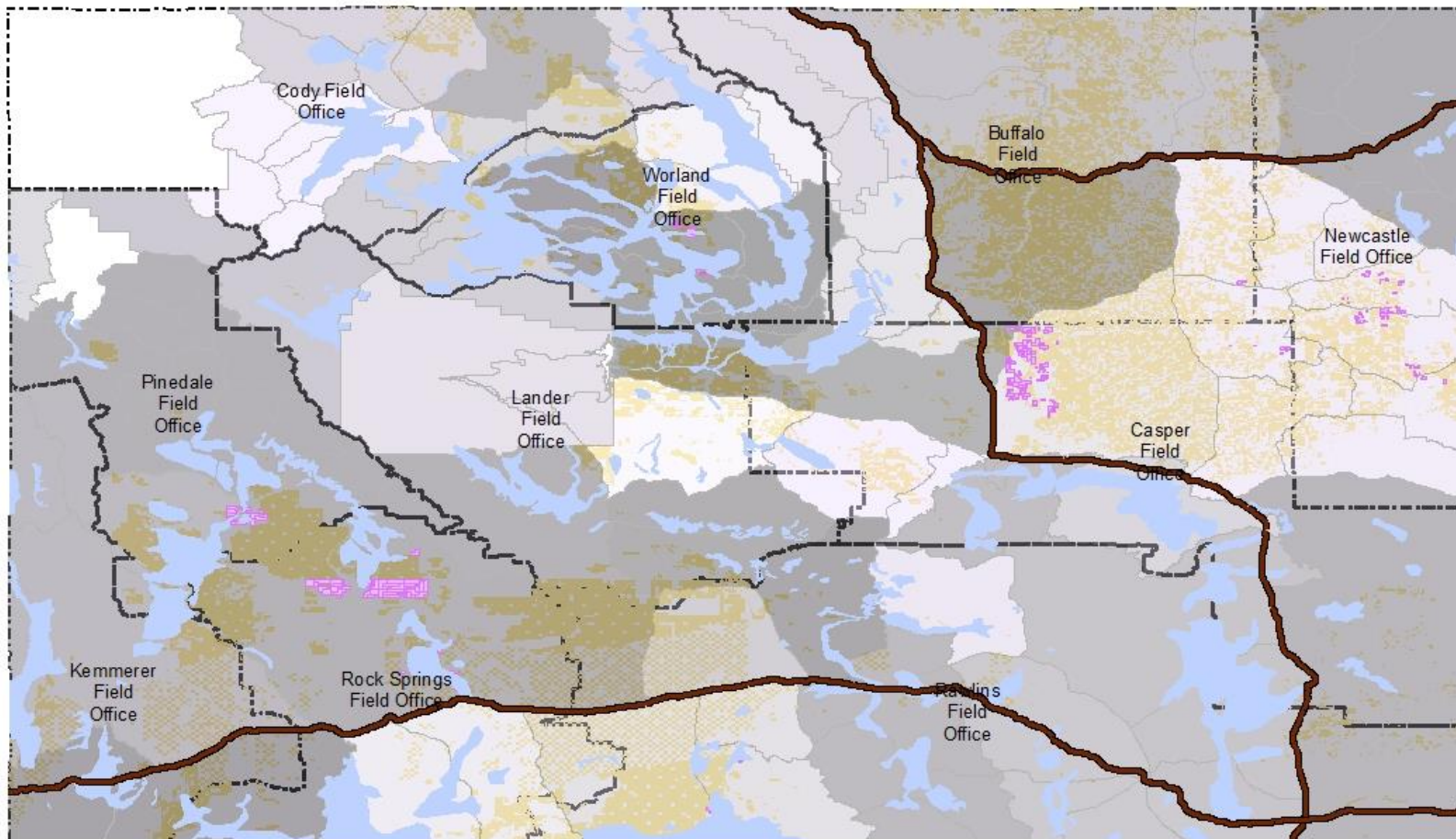
## **5.7 Wildlife Habitat Maps**





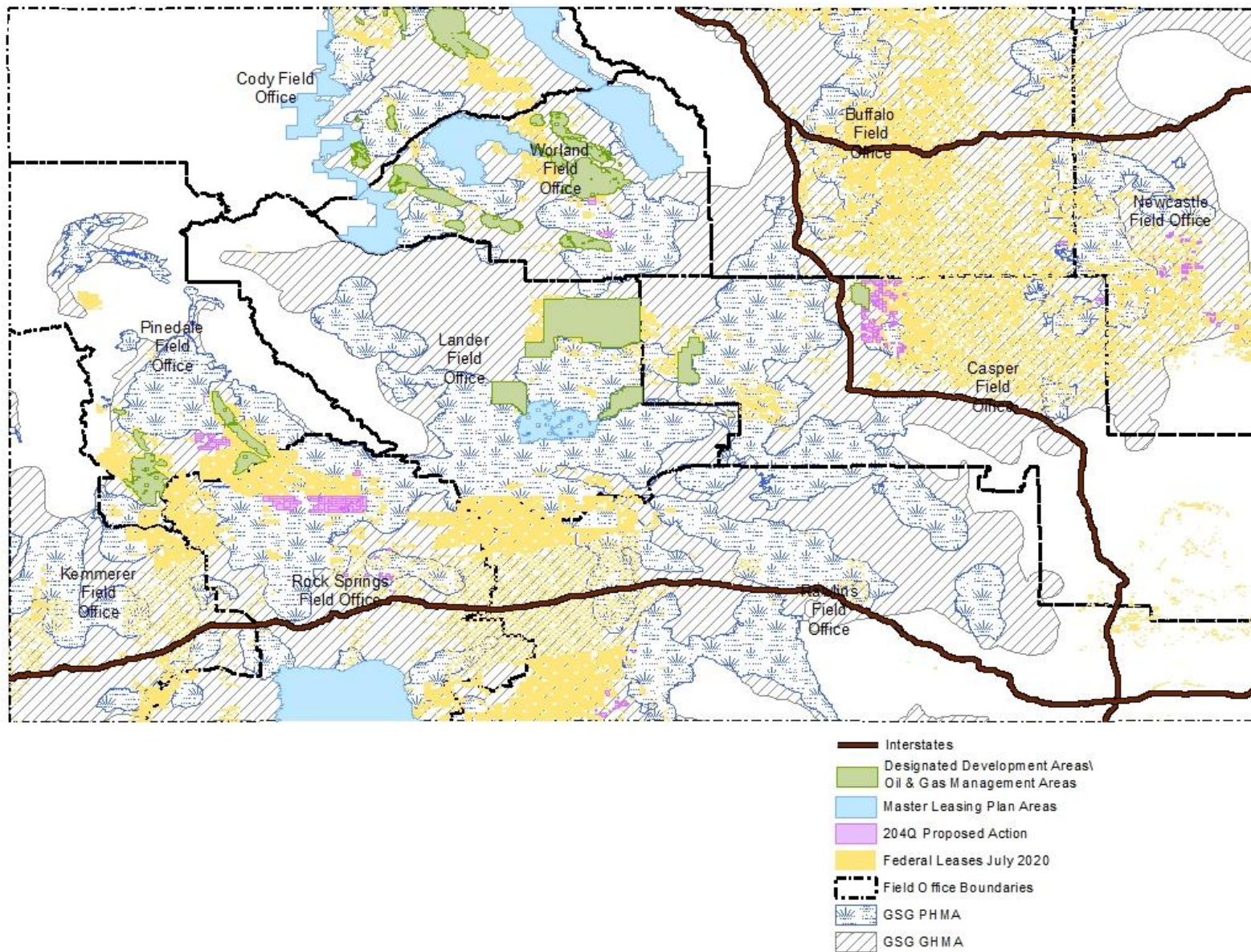


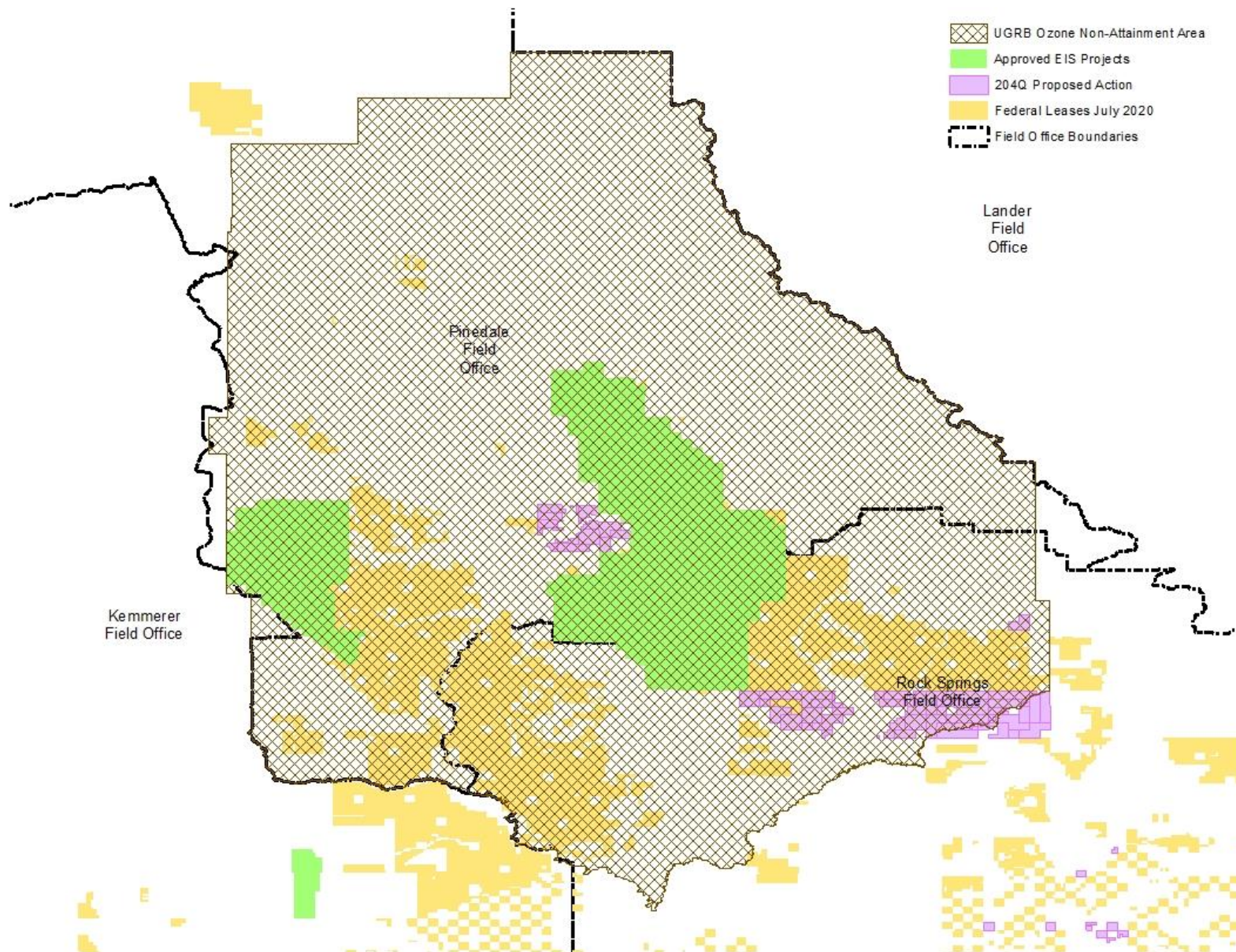




#### Mule Deer Herd Units

-  Interstates
-  204Q Proposed Action
-  Mule Deer Crucial Winter Range
-  Mule Deer Herd Areas
-  Federal Leases July 2020
-  Field Office Boundaries Wyoming





## 5.8 Lands with Wilderness Characteristics (LWCs) Review

Wilderness Review Checklist for Oil and Gas Lease Parcels						
Sec. 603 (43 USC 1782). The Wilderness Act states:						
<p><i>"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."</i></p>						
<p><i>"The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A 'way' maintained solely by the passage of vehicles does not constitute a road. "</i></p>						
High Plains District			Lease Sale Month and Year:		4Q 2020	
Parcel No.	More than 5000 of roadless land (yes/no)	Imprint of man's work substantially unnoticeable (yes/no)	Outstanding opportunity for solitude or primitive recreation (yes/no)	Contains natural features of scientific, educational, scenic, or historical value (yes/no)	In Citizens Proposed Wilderness Area (yes/no). If yes but dropped during RMP process, state why.	Field Office Notes or Explanations
WY-204Q-0717	No	No	No	No	No	Parcel is within Lance Creek Fossil Area, Parcel is withing 1/4 mile or visual horizon of Cheyenne-Deadwood Trail
WY-204Q-0721	No	No	No	No	No	
WY-204Q-0722	No	No	No	No	No	
WY-204Q-0725	No	No	No	No	No	
WY-204Q-0726	No	No	No	No	No	
WY-204Q-0728	No	No	No	No	No	
WY-204Q-0729	No	No	No	No	No	
WY-204Q-0731	No	No	No	No	No	
WY-204Q-6894	No	No	No	No	No	
WY-204Q-6895	No	No	No	No	No	
WY-204Q-6899	No	No	No	No	No	

WY-204Q-6901	No	No	No	No	No	
WY-204Q-6905	No	No	No	No	No	
WY-204Q-6906	No	No	No	No	No	
WY-204Q-6907	No	No	No	Yes	No	Parcel is within Lance Creek Fossil Area.
WY-204Q-6908	No	No	No	No	No	
WY-204Q-6909	No	No	No	No	No	
WY-204Q-6910	No	No	No	No	No	
WY-204Q-6911	No	No	No	No	No	
WY-204Q-6912	No	No	No	No	No	
WY-204Q-6913	No	No	No	No	No	
WY-204Q-6914	No	No	No	No	No	
WY-204Q-0733	No	No	No	No	No	
WY-204Q-0734	No	No	No	No	No	
WY-204Q-0738	No	No	No	No	No	
WY-204Q-0741	No	No	No	No	No	
WY-204Q-0742	No	No	No	No	No	
WY-204Q-0743	No	No	No	No	No	
WY-204Q-0745	No	No	No	No	No	
WY-204Q-0749	No	Yes	Yes	Yes	Yes	This parcel overlaps with the Little Pine Ridge LWC- Subunits 2 & 4. There is LWC potential in subunit 4 (403 acres of overlap) and no LWC potential in subunit 2 (133 acres of overlap).
WY-204Q-0750	No	No	No	No	No	
WY-204Q-0758	No	No	No	No	No	This parcel overlaps with the Cottonwood Creek LWC- Subunit 2. The Subunit is not LWC eligible.
WY-204Q-0768	No	No	No	No	No	
WY-204Q-0769	No	No	No	No	No	
WY-204Q-0770	No	No	No	No	No	
WY-204Q-0781	No	No	No	No	No	
WY-204Q-0795	No	No	No	No	No	
WY-204Q-0829	No	No	No	No	No	
WY-204Q-0830	No	No	No	No	No	
WY-204Q-0831	No	No	No	No	No	
WY-204Q-0835	No	No	No	No	No	
WY-204Q-0836	No	No	No	No	No	
WY-204Q-6915	No	No	No	No	No	
WY-204Q-6917	No	No	No	No	No	
WY-204Q-6918	No	No	No	No	No	

WY-204Q-6919	No	Yes	Yes	Yes	Yes	This parcel overlaps with the Little Pine Ridge LWC- Subunits 1 & 4. There is LWC potential in subunit 4 (516 acres of overlap) and no LWC potential in subunit 1 (522 acres of overlap).
WY-204Q-6924	No	No	No	No	No	
WY-204Q-6925	No	No	No	No	No	This parcel overlaps with the Cottonwood Creek LWC- Subunit 2. The Subunit is not LWC eligible.
WY-204Q-6927	No	No	No	No	No	This parcel overlaps with the Cottonwood Creek LWC- Subunit 2. The Subunit is not LWC eligible.
WY-204Q-6928	No	No	No	No	No	
WY-204Q-6934	No	No	No	No	No	
WY-204Q-6939	No	No	No	No	No	
WY-204Q-6941	No	No	No	No	No	
WY-204Q-6945	No	No	No	No	No	
WY-204Q-6963	No	No	No	No	No	
WY-204Q-6965	No	No	No	No	No	
WY-204Q-6966	No	No	No	No	No	
WY-204Q-6916	No	No	No	No	No	Portions of S22 part of a USFS inventoried roadless area.

Wilderness Review Checklist for Oil and Gas Lease Parcels		
Sec. 603 (43 USC 1782). The Wilderness Act states:		
<p><i>"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."</i></p>		
<p><i>"The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A 'way' maintained solely by the passage of vehicles does not constitute a road. "</i></p>		
Worland Field Office	Lease Sale Month and Year:	4Q 2020

Parcel No.	More than 5000 of roadless land (yes/no)	Imprint of man's work substantially unnoticeable (yes/no)	Outstanding opportunity for solitude or primitive recreation (yes/no)	Contains natural features of scientific, educational, scenic, or historical value (yes/no)	In Citizens Proposed Wilderness Area (yes/no). If yes but dropped during RMP process, state why.	Field Office Notes or Explanations
WY-204Q-0757	No	No	No	No	No	
WY-204Q-0761	No	No	No	No	No	
WY-204Q-0762	Yes	Yes	Yes	Yes	No	0016 DH
WY-204Q-0763	No	No	No	No	No	
WY-204Q-0764	No	No	No	No	No	0016 DH
WY-204Q-6931	No	No	No	No	No	
WY-204Q-6933	No	No	No	No	No	

Wilderness Review Checklist for Oil and Gas Lease Parcels		
Sec. 603 (43 USC 1782). The Wilderness Act states:		
<p><i>"A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."</i></p>		
<p><i>"The word 'roadless' refers to the absence of roads which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. A 'way' maintained solely by the passage of vehicles does not constitute a road. "</i></p>		
High Desert District	Lease Sale Month and Year:	4Q 2020

Parcel No.	More than 5000 of roadless land (yes/no)	Imprint of man's work substantially unnoticeable (yes/no)	Outstanding opportunity for solitude or primitive recreation (yes/no)	Contains natural features of scientific, educational, scenic, or historical value (yes/no)	In Citizens Proposed Wilderness Area (yes/no). If yes but dropped during RMP process, state why.	Field Office Notes or Explanations
WY-204Q-0767	No	N/A	N/A	N/A	N/A	
WY-204Q-0774	No	N/A	N/A	N/A	N/A	
WY-204Q-0775	Yes	No	N/A	N/A	N/A	
WY-204Q-0776	Yes	No	N/A	N/A	N/A	
WY-204Q-0777	No	N/A	N/A	N/A	N/A	
WY-204Q-0778	Yes	No	N/A	N/A	N/A	
WY-204Q-0779	No	N/A	N/A	N/A	N/A	
WY-204Q-0788	Yes	Yes	Yes	Yes	NO	
WY-204Q-0790	Yes	No	N/A	N/A	N/A	
WY-204Q-0791	No	N/A	N/A	N/A	N/A	
WY-204Q-0792	No	N/A	N/A	N/A	N/A	
WY-204Q-0794	Yes	No	N/A	N/A	N/A	
WY-204Q-0798	Yes	Yes	Yes	Yes	No	Meets wilderness characteristics, meets size, meets naturalness, fails solitude
WY-204Q-0799	Yes	No	N/A	N/A	N/A	
WY-204Q-0801	No	N/A	N/A	N/A	N/A	
WY-204Q-0803	No	N/A	N/A	N/A	N/A	
WY-204Q-0805	No	N/A	N/A	N/A	N/A	
WY-204Q-0806	Yes	Yes	Yes	Yes	No	Meets wilderness characteristics
WY-204Q-0807	Yes	Yes	Yes	Yes	No	Meets wilderness characteristics
WY-204Q-0809	Yes	Yes	Yes	Yes	No	Fails size
WY-204Q-0810	Yes	Yes	Yes	Yes	No	Meets wilderness characteristics
WY-204Q-0812	No	N/A	N/A	N/A	N/A	
WY-204Q-0813	No	N/A	N/A	N/A	N/A	
WY-204Q-0814	Yes	No	N/A	N/A	N/A	
WY-204Q-0815	Yes	No	N/A	N/A	N/A	
WY-204Q-0816	No	N/A	N/A	N/A	N/A	
WY-204Q-6935	No	N/A	N/A	N/A	Yes	
WY-204Q-6936	No	N/A	N/A	N/A	No	
WY-204Q-6937	Yes	No	N/A	N/A	N/A	
WY-204Q-6938	Yes	Yes	No	N/A	N/A	

WY-204Q-6940	Yes	No	N/A	N/A	N/A	
WY-204Q-6949	Yes	Yes	Yes	Yes	No	Meets wilderness characteristics
WY-204Q-6950	Yes	Yes	Yes	Yes	No	Meets wilderness characteristics
WY-204Q-6951	No	N/A	N/A	N/A	N/A	
WY-204Q-6952	No	N/A	N/A	N/A	N/A	
WY-204Q-6953	No	N/A	N/A	N/A	N/A	
WY-204Q-6954	No	N/A	N/A	N/A	N/A	
WY-204Q-6955	No	N/A	N/A	N/A	N/A	
WY-204Q-6956	No	N/A	N/A	N/A	N/A	
WY-204Q-6957	No	N/A	N/A	N/A	N/A	
WY-204Q-6958	No	N/A	N/A	N/A	N/A	
WY-204Q-6959	Yes	No	N/A	N/A	N/A	
WY-204Q-0755	Yes	No	N/A	N/A	No	
WY-204Q-0759	Yes	No	N/A	N/A	No	
WY-204Q-0760	Yes	No	N/A	N/A	No	
WY-204Q-0765	Yes	No	N/A	N/A	No	
WY-204Q-0766	Private surface	Private surface	Private surface	Private surface	Private surface	
WY-204Q-6224	Yes	No	N/A	N/A	No	
WY-204Q-6732	Yes	No	N/A	N/A	No	
WY-204Q-6932	Yes	No	N/A	N/A	No	
WY-204Q-0817	Yes	Yes	Yes	Yes	No	Completed in 2019. Unit does have wilderness characteristics.
WY-204Q-0819	Yes	Yes	Yes	Yes	No	Completed in 2019. Unit does have wilderness characteristics.
WY-204Q-0820	No	No	No	No	No	
WY-204Q-0821	No	No	No	No	No	
WY-204Q-0823	No	No	No	No	No	
WY-204Q-0824	No	No	No	No	No	
WY-204Q-0825	No Leasing	No Leasing	No Leasing	No Leasing	No Leasing	
WY-204Q-0827	No Leasing	No Leasing	No Leasing	No Leasing	No Leasing	
WY-204Q-0828	No Leasing	No Leasing	No Leasing	No Leasing	No Leasing	
WY-204Q-6879 within WYD01-6300-102	No	No	No	No	No	
WY-204Q-6879 within WYD01-6300-105	Yes	Yes	Yes	Yes	No	WYD01-6300-105 completed in 2019. Unit does have wilderness characteristics.
WY-204Q-6960 within WYD01-6300-218	No	No	No	No	No	

WY-204Q-6960 within WYD01- 6300-211	Yes	Yes	Yes	Yes	No	WYD01-6300-211 completed in 2019. Unit does have wilderness characteristics.
---	-----	-----	-----	-----	----	---

\*Parcels with N/A in the first column are all on private land and no wilderness inventories occurred.

## **5.9 Hydraulic Fracturing White Paper (July 5, 2013)**

### **BACKGROUND**

Hydraulic fracturing (HF) is a well stimulation process used to maximize the extraction of underground resources – oil, natural gas and geothermal energy. The HF process includes the acquisition of water/mixing of chemicals, production zone fracturing, and HF flowback disposal.

In the United States, HF has been used since the 1940's. Early on, the HF process utilized pressures that are of a much smaller magnitude than those used today.

The HF process involves the injection of a fracturing fluid and propping agent into the hydrocarbon bearing formation under sufficient pressure to further open existing fractures and/or create new fractures. This allows the hydrocarbons to more readily flow into the wellbore. HF has gained interest recently as hydrocarbons previously trapped in low permeability tight sand and shale formations are now technically and economically recoverable. As a result, oil and gas production has increased significantly in the United States. The state of Wyoming classifies all gas production zones as Class 5 groundwater zones; this means these zones can be highly impacted by oil and gas activities and are exempt from regulation under the Clean Water Act. However, operations within these zones cannot cause other zones to lose their use classification.

Prior to the development of hydrocarbon bearing tight gas and shale formations, domestic production of conventional resources had been declining. In response to this decline, the federal government in the 1970's through 1992, passed tax credits to encourage the development of unconventional resources. It was during this time that the HF process was further advanced to include the high-pressure multi-stage frac jobs used today.

Generally, HF can be described as follows:

1. Water, proppant, and chemical additives are pumped at extremely high pressures down the wellbore.
2. The fracturing fluid is pumped through perforated sections of the wellbore and into the surrounding formation, creating fractures in the rock. The proppant holds the fractures open during well production.
3. Company personnel continuously monitor and gauge pressures, fluids and proppants, studying how the sand reacts when it hits the bottom of the wellbore, slowly increasing the density of sand to water as the frac progresses.
4. This process may be repeated multiple times, in "stages" to reach maximum areas of the formation(s). The wellbore is temporarily plugged between each stage to maintain the highest fluid pressure possible and get maximum fracturing results in the rock.
5. The plugs are drilled or removed from the wellbore and the well is tested for results.
6. The pressure is reduced and the fracturing fluids are returned up the wellbore for disposal or treatment and re-use, leaving the sand in place to prop open the fractures and allow the oil/gas to flow.

### **OPERATIONAL ISSUES**

Wells that undergo HF may be drilled vertically, horizontally, or directionally and the resultant fractures induced by HF can be vertical, horizontal, or both. Wells in Wyoming (WY) may extend to depths greater than 20,000 feet or less than 1,000 feet, and horizontal sections of a well may extend several thousand feet from the production pad on the surface<sup>52</sup>.

The total volume of fracturing fluids is generally 95-99% water. The amount of water needed to fracture a well in WY depends on the geologic basin, the formation, and depth and type of well (vertical, horizontal, directional), and the proposed completion process.

In general, approximately 50,000 to 300,000 gallons may be used to fracture shallow coalbed methane wells in the Powder River Basin, while approximately 800,000 to 2 million gallons may be used to fracture deep tight sand gas

---

<sup>52</sup> See Kemmerer RMP (2010), Pinedale RMP (2008), Green River RMP (1997), Rock Springs RMP Revision, and Rawlins RMP (2008) RFD and/or Mineral Occurrence Reports for specific information on current and projected oil and gas development.

wells in southwestern WY. In the Niobrara oil play, approximately 250,000 gallons may be used to fracture a vertical well, while up to 5 million gallons may be used to fracture a horizontal well.

Proppant, consisting of synthetic or natural silica sand, may be used in quantities of a few hundred tons for a vertical well to a few thousand tons for a horizontal well.

Drilling muds, drilling fluids, water, proppant and hydraulic fracturing fluids are stored in onsite tanks or lined pits during the drilling and/or completion process. Equipment transport and setup can take several days, and the actual HF and flowback process can occur in a few days up to a few weeks. For oil wells, the flowback fluid from the HF operations is treated in an oil-water separator before it is stored in a lined pit or tank located on the surface. Where gas wells are flowed back using a “green completion process” fluids are run through a multi-phase separator, which are then piped directly to enclosed tanks or to a production unit.

**Gas emissions** associated with the HF process are captured when the operator utilizes a green completion process. Where a green completion process is not utilized, gas associated with the well may be vented and/or flared until “saleable quality” product is obtained in accordance with federal and state rules and regulations. The total volume of emissions from the equipment used (trucks, engines) will vary based on the pressures needed to fracture the well, and the number of zones to be fractured. Emissions associated with a project, and HF if proposed, will be analyzed through a site specific NEPA document to ensure that the operation will not cause a violation of the Clean Air Act.

Under either completion process, wastewaters from HF may be disposed in several ways. For example, the flowback fluids may be stored in tanks pending reuse; the resultant waste may be re-injected using a permitted injection well, or the waste may be hauled to a licensed facility for treatment, disposal and/or reuse.

Disposal of the waste stream following establishment of “sale-quality” product, would be handled in accordance with Onshore Order #7 regulations and other state/federal rules and regulations.

### **FRACTURING FLUIDS**

As indicated above, the fluid used in the HF process is approximately 95 to 99 percent water and a small percentage of special-purpose chemical additives<sup>53, 54</sup> and proppant. There is a broad array of chemicals that can be used as additives in a fracture treatment including, but not limited to, hydrochloric acid, anti-bacterial agents, corrosion inhibitors, gelling agents (polymers), surfactants, and scale inhibitors. The 1 to 5 percent of chemical additives translates to a minimum of 5,000 gallons of chemicals for every 1.5 million gallons of water used to fracture a well (Paschke, Dr. Suzanne. USGS, Denver, Colorado. September 2011). Water used in the HF process is generally acquired from surface water or groundwater in the local area.

### **RE-FRACTURING**

Re-fracturing of wells (RHF) may be performed after a period of time to restore declining production rates. RHF success can be attributed to enlarging and reorienting existing fractures while restoring conductivity due to proppant degradation and fines plugging.

Prior to RHF, the wellbore may be cleaned out. Cleaning out the wellbore may recover over 50% of the initial frac sand. Once cleaned, the process of RHF is the same as the initial HF. The need for RHF cannot be predicted.

### **WATER AVAILABILITY AND CONSUMPTION ESTIMATES**

The Wyoming Framework Water Plan, A Summary, (Wyoming Water Development Commission, October 2007), indicates that approximately 15 million acre-feet per year of water becomes either surface water or groundwater and is available for use. This estimate includes water that flows into the state and the precipitation that runs off as stream flow or infiltrates as groundwater; it does not include volumes lost to evapotranspiration.

Water flowing out of WY is estimated to be 13,678,200 acre-feet per year. Wyoming’s share of this supply under existing water compacts is estimated to be 3,313,500 acre-feet per year; approximately 10,364,700 acre-feet flows downstream out of the state.

---

<sup>53</sup> FracFocus Chemical Registry. Hydraulic Fracturing Water Usage

<sup>54</sup> Chesapeake Energy. 2012. Hydraulic Fracturing Fact Sheet. [http://www.chk.com/Media/Educational-Library/Fact-Sheets/Corporate/Hydraulic\\_Fracturing\\_Fact\\_Sheet.pdf](http://www.chk.com/Media/Educational-Library/Fact-Sheets/Corporate/Hydraulic_Fracturing_Fact_Sheet.pdf) (Last accessed March 1, 2012)

The industrial water use sector includes electric power generation, coal mining, conventional oil and gas production, uranium mining, trona mining and soda ash production, bentonite mining, gypsum mining, coalbed methane (CBM) production, manufacturing of aggregate, cement, and concrete, and road and bridge construction.

Total current industrial surface water use for Wyoming is estimated to be 125,000 acre-feet per year. Total current industrial groundwater water use is estimated to be 246,000 acre-feet per year.

According to the state water plan, it appears likely that any new water-intensive industrial developments in the state over the next 30 years will fall into the electric power generation and/or chemical products categories. The other two intensive water use industries, primary metals and paper producers, tend to locate near the source of their largest process inputs – metals and wood respectively. The total projected industrial use under the Mid Scenario is 331,000 acre-feet per year. The Mid-Scenario is a middle of the road estimate versus the projected low or high scenarios.

Water needs for future fracturing jobs were estimated for this discussion paper using the current Reasonable Foreseeable Development (RFD) scenario numbers taken from each of the nine WY RMPs and multiplied by the maximum volume of water necessary based on information located at [fracfocus.org](http://fracfocus.org). The table is provided, below. Based on a statewide RFD of 25,478 non-CBM wells and 18,299 CBM wells, the maximum projected water needs for HF is 401,319 acre-feet of water. This number is an estimate based upon maximum projected water needs per HF job, and assumes that 100% of the water is freshwater.

According to the WOGCC, as of August 19, 2018, there are approximately 457 Disposal wells in the state disposing of oil and gas waste water. Data obtained from the Wyoming Oil and Gas Conservation Commission, for a period ending June 30, 2018, indicates that 4,979,807,439 barrels of water have been injected into underground formations for disposal purposes. These injection wells may also utilize HF depending upon the specific geology of the disposal zone; however, subsequent disposal operations utilize injection pressures below the fracture stress of the receiving formation to ensure containment in the targeted zone. Each formation for which injection is approved must receive an aquifer exemption from the Environmental Protection Agency documenting that the injectate will be properly contained and that the formation receiving the water is not of useable quality (DEQ Class 4 Use).

### **POTENTIAL SOURCES OF WATER FOR HYDRAULIC FRACTURING**

Freshwater-quality water is required to drill the surface-casing section of the wellbore per federal regulations; other sections of the wellbore (intermediate and/or production strings) would be drilled with appropriate quality makeup water as necessary. This is done to protect usable water zones from contamination, to prevent mixing of zones containing different water quality/use classifications, and to minimize total freshwater volumes. With detailed geologic well logging during drilling operations, geologists/mud loggers on location identify the bottoms of these usable water zones, which aids in the proper setting of casing depths.

Several sources of water are available for drilling and/or HF in WY. Because WY's water rights system is based in the prior appropriation doctrine, water cannot be diverted from a stream/reservoir or pumped out of the ground for drilling and/or HF without reconciling that diversion with the prior appropriation doctrine. Like any other water user, companies that drill or hydraulically fracture oil and gas wells must adhere to WY water laws when obtaining and using specific sources of water.

Below is a discussion of the sources of water that could potentially be used for HF. The decision to use any specific source is dependent on BLM authorization at the APD stage and the ability to satisfy the water appropriation doctrine. BLM must also consult in accordance with the Endangered Species Act (ESA) as amended (16 U.S.C. 1531 et seq.) with the U.S Fish and Wildlife Service (FWS) on projects resulting in consumptive water use over de minimus levels, in the Platte and Colorado River Basins of WY. Where this is an issue, USFWS was consulted during the preparation of the appropriate RMP and would again be consulted on a case by case basis. From an operators' standpoint, the decision regarding which water source will be used is primarily driven by the economics associated with procuring a specific water source.

Water transported from outside the state. The operator may transport water from outside the state. As long as the transport and use of the water carries no legal obligation to Wyoming, this is an allowable source of water from a water rights perspective.

Irrigation water leased or purchased from a landowner. The landowner may have rights to surface water, delivered by a ditch or canal that is used to irrigate land. The operator may choose to enter into an agreement with the landowner to purchase or lease a portion of that water. This is allowable, however, in nearly every case, the use of an irrigation water right is likely limited to irrigation uses and cannot be used for well drilling and HF operations. To allow its use for drilling and HF, the owner of the water right and the operator must apply to change the water right through a formal process.

Treated water or raw water leased or purchased from a water provider. The operator may choose to enter into an agreement with a water provider to purchase or lease water from the water provider's system. Municipalities and other water providers may have a surplus of water in their system before it is treated (raw water) or after treatment that can be used for drilling and HF operations. Such an arrangement would be allowed only if the operator's use were compliant with the water provider's water rights.

Water treated at a waste water treatment plant leased or purchased from a water provider. The operator may choose to enter into an agreement with a water provider to purchase or lease water that has been used by the public, and then treated as wastewater.

Municipalities and other water providers discharge their treated waste water into the streams where it becomes part of the public resource, ready to be appropriated once again in the priority system. But for many municipalities a portion of the water that is discharged has the character of being "reusable." As a result, it is possible that after having been discharged to the stream, it could be diverted by the operator to be used for drilling and HF operations. Such an arrangement would only be appropriate with the approval of the WY State Engineer's Office (WSEO) and would be allowed only if the water provider's water rights include uses for drilling and HF operations.

New diversion of surface water flowing in streams and rivers. New diversion of surface waters in most parts of the state are rare because the surface streams are already "over appropriated," that is, the flows do not reliably occur in such a magnitude that all of the vested water rights on those streams can be satisfied. Therefore, the only time that an operator may be able to divert water directly from a river is during periods of high flow and less demand. These periods do occur but not reliably or predictably.

Produced Water. The operator may choose to use water produced in conjunction with oil or gas production at an existing oil or gas well. The water that is produced from an oil or gas well is under the administrative purview of the WSEO and is either non-tributary, in which case, it is administered independent of the prior appropriation doctrine; or is tributary, in which case, the depletions from its withdrawal must be fully augmented if the depletions occur in an over-appropriated basin. The result in either case is that the produced water is available for consumption for other purposes, not just oil and gas operations. The water must not be encumbered by other needs and the operator must obtain a proper well permit from the WSEO before the water can be used for drilling and HF operations.

Reused or Recycled Drilling Water. Water that is used for drilling of one well may be recovered and reused in the construction of subsequent wells. The BLM encourages reuse and recycling of both the water used in well drilling and the water produced in conjunction with oil or gas production. However, as described above, the operator must obtain the right to use the water for this purpose.

On-Location Water Supply Wells. Operators may apply for, and receive, permission from the WSEO to drill and use a new water supply well. These wells are usually drilled on location to provide an on-demand supply. These industrial-type water supply wells are typically drilled deeper than nearby domestic and/or stock wells to minimize drawdown interference, and have large capacity pumps. The proper construction, operation and maintenance, backflow prevention and security of these water supply wells are critical considerations at the time they are proposed to minimize impacts to the well and/or the waters in the well and are under the jurisdiction of the WSEO. Plugging these wells are also under the jurisdiction of the WSEO.

## **POTENTIAL IMPACTS TO USABLE WATER ZONES**

Impacts to freshwater supplies can originate from point sources, such as chemical spills, chemical storage tanks (aboveground and underground), industrial sites, landfills, household septic tanks, and mining activities. Impacts to usable waters may also occur through a variety of oil and gas operational sources which may include, but are not limited to, pipeline and well casing failure, and well (gas, oil and/or water) drilling and construction of related

facilities. Similarly, improper construction and management of open fluids pits and production facilities could degrade ground water quality through leakage and leaching.<sup>55</sup>

Should hydrocarbons or associated chemicals for oil and gas development, including HF, exceeding EPA/WDEQ standards for minimum concentration levels migrate into culinary water supply wells, springs, or usable water systems, it could result in these water sources becoming non-potable. Water wells developed for oil and gas drilling could also result in a draw down in the quantity of water in nearby residential areas depending upon the geology; however it is not currently possible to predict whether or not such water wells would be developed.

Usable groundwater aquifers are most susceptible to pollution where the aquifer is shallow (within 100 feet of the surface depending on surface geology) or perched, are very permeable, or connected directly to a surface water system, such as through floodplains and/or alluvial valleys or where operations occur in geologies which are highly fractured and/or lack a sealing formation between the production zone and the usable water zones. If an impact to usable waters were to occur, a greater number of people could be affected in densely populated areas versus sparsely populated areas characteristic of WY.

Potential impacts on usable groundwater resources from fluid mineral extraction activities can result from the five following scenarios:

- Contamination of aquifers through the introduction of drilling and/or completion fluids through spills or drilling problems such as lost circulation zones.
- Communication of the induced hydraulic fractures with existing fractures potentially allowing frac fluid migration into usable water zones/supplies. The potential for this impact is likely dependent on the local hydraulic gradients where those fluids are dissolved in the water column. To date, this is an unproven theory.
- Cross-contamination of aquifers/formations that may result when fluids from a deeper aquifer/formation migrate into a shallower aquifer/formation due to improperly cemented well casings.
- Localized depletion of unconfined groundwater availability.
- Progressive contamination of deep confined, shallow confined, and unconfined aquifers if the deep confined aquifers are not completely cased off, and geologically isolated, from deeper units. An example of this would be salt water intrusion resulting from sustained drawdown associated with the pumping of groundwater.

The impacts above could occur as a result of the following processes:

#### Improper casing and cementing.

A well casing design that is not set at the proper depths or a cementing program that does not properly isolate necessary formations could allow oil, gas or HF fluids to contaminate other aquifers/formations.

#### Natural fractures, faults, and abandoned wells.

If HF of oil and gas wells result in new fractures connecting with established natural fractures, faults, or improperly plugged dry or abandoned wells, a pathway for gas or contaminants to migrate underground may be created posing a risk to water quality. The potential for this impact is currently unknown but it is generally accepted that the potential decreases with increasing distance between the production zone and usable water zones. This potential again is dependent upon the site specific conditions at the well location.

#### Fracture growth.

A number of studies and publications report that the risk of induced fractures extending out of the target formation into an aquifer—allowing hydrocarbons or other fluids to contaminate the aquifer—may depend, in part, on the formation thickness separating the targeted fractured formation and the aquifer. For example, according to a 2012 Bipartisan Policy Center report, the fracturing process itself is unlikely to directly affect freshwater aquifers because fracturing typically takes place at a depth of 6,000 to 10,000 feet, while drinking water aquifers are typically less than 1,000 feet deep. Fractures created during HF have not been shown to span the distance between the targeted formation and freshwater bearing zones. If a parcel is sold and development is proposed in usable water zones, those

---

<sup>55</sup> See Subject RMP, Chapter 4, Environmental Consequences, for additional information

operations would have to comply with federal and/or state water quality standards or receive a Class 5 designation from the WDEQ.

Fracture growth and the potential for upward fluid migration, through coal and other geologic formations depend on site-specific factors such as the following:

1. Physical properties, types, thicknesses, and depths of the targeted formation as well as those of the surrounding geologic formations.
2. Presence of existing natural fracture systems and their orientation in the target formation and surrounding formations.
3. Amount and distribution of stress (i.e., in-situ stress), and the stress contrasts between the targeted formation and the surrounding formations.

Hydraulic fracture stimulation designs include the volume of fracturing fluid injected into the formation as well as the fluid injection rate and fluid viscosity; this information would be evaluated against the above site specific considerations.

#### Fluid leak and recovery (flowback) of HF fluids.

It is theorized that not all fracturing fluids injected into the formation during the HF process may be recovered. It is theorized that fluid movement into smaller fractures or other geologic substructures can be to a point where flowback efforts will not recover all the fluid or that the pressure reduction caused by pumping during subsequent production operations may not be sufficient to recover all the fluid that has leaked into the formation. It is noted that the fluid loss due to leakage into small fractures and pores is minimized by the use of cross-linked gels.

Willberg et al. (1998) analyzed HF flowback and described the effect of pumping rates on cleanup efficiency in initially dry, very low permeability (0.001 md) shale. Some wells in this study were pumped at low flowback rates (less than 3 barrels per minute (bbl/min)). Other wells were pumped more aggressively at greater than 3 bbl/min. Thirty-one percent of the injected HF fluids were recovered when low flowback rates were applied over a 5-day period. Forty-six percent of the fluids were recovered when aggressive flowback rates were applied in other wells over a 2-day period. In both cases, additional fluid recovery (10 percent to 13 percent) was achieved during the subsequent gas production phase, resulting in a total recovery rate of 41 percent to 59 percent of the initial volume of injected HF fluid. Ultimate recovery rate however, is dependent on the permeability of the rocks, fracture configuration, and the surface area of the fracture(s).

The ability of HF chemicals to migrate in an undissolved or dissolved phase into a usable water zone is likely dependent upon the location of the sealing formation (if any), the geology of the sealing formation, hydraulic gradients and production pressures. The following discussion, adapted from: Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs; Chapter 3 Characteristics of CBM Production and Associated HF Practices (3-5EPA 816-R-04-003, June, 2004), takes place where there is not a sealing formation between the fractured formation and usable waters; the two zones are separated by approximately 1000' of earth in the Powder River Basin of WY.

HF Fluids can remain in the subsurface unrecovered, due to "leak off" into connected fractures and the pores of rocks. Fracturing fluids injected into the primary hydraulically induced fracture can intersect and flow (leak off) into preexisting smaller natural fractures. Some of the fluids lost in this way may occur very close to the well bore after traveling minimal distances in the hydraulically induced fracture before being diverted into other fractures and pores. Once "mixed" with the native water, local and regional vertical and horizontal gradients may influence where and if these fluids will come in contact with usable water zones, assuming that there is inadequate recovery either through the initial flowback or over the productive life of the well. Faults, folds, joints, etc., could also alter localized flow patterns as discussed below.

The following processes can influence effective recovery of the fracture fluids:

#### *Check-Valve Effect*

A check-valve effect occurs when natural and/or newly created fractures open and HF fluid is forced into the fractures when fracturing pressures are high, but the fluids are subsequently prevented from flowing back toward the

wellbore as the fractures close when the fracturing pressure is decreased (Warpinski et al., 1988; Palmer et al., 1991a). A long fracture can be pinched-off at some distance from the wellbore. This reduces the effective fracture length. HF fluids trapped beyond the “pinch point” are unlikely to be recovered during flowback and oil/gas is unlikely to be recovered during production.

In most cases, when the fracturing pressure is reduced, the fracture closes in response to natural subsurface compressive stresses. Because the primary purpose of hydraulic fracturing is to increase the effective permeability of the target formation and connect new or widened fractures to the wellbore, a closed fracture is of little use. Therefore, a component of HF is to “prop” the fracture open, so that the enhanced permeability from the pressure-induced fracturing persists even after fracturing pressure is terminated. To this end, operators use a system of fluids and “proppants” to create and preserve a high-permeability fracture-channel from the wellbore deep into the formation.

The check-valve effect takes place in locations beyond the zone where proppants have been placed (or in smaller secondary fractures that have not received any proppant). It is possible that some volume of stimulation fluid cannot be recovered due to its movement into zones that were not completely “propped” open.

#### *Adsorption and Chemical Reactions*

Adsorption and chemical reactions can also prevent HF fluids from being recovered. Adsorption is the process by which fluid constituents adhere to a solid surface and are thereby unavailable to flow with groundwater. Adsorption to coal is likely; however, adsorption to other geologic material (e.g., shale, sandstone) is likely to be minimal. Another possible reaction affecting the recovery of fracturing fluid constituents is the neutralization of acids (in the fracturing fluids) by carbonates in the subsurface.

#### *Movement of Fluids Outside the Capture Zone*

Fracturing fluids injected into the target zone flow into fractures under very high pressure. The hydraulic gradients driving fluid flow away from the wellbore during injection are much greater than the hydraulic gradients pulling fluid flow back toward the wellbore during flowback and production (pumping) of the well. Some portion of the fracturing fluids could be forced along the hydraulically induced fracture to a point beyond the capture zone of the production well. The size of the capture zone will be affected by the regional groundwater gradients, and by the drawdown caused by producing the well. Site-specific geologic, hydrogeologic, injection pressure, and production pumping details should provide the information needed to estimate the dimension of the production well capture zone and the extent to which the fracturing fluids might disperse and dilute.

#### *Incomplete Mixing of Fracturing Fluids with Water*

Steidl (1993) documented the occurrence of a gelling agent that did not dissolve completely and actually formed clumps at 15 times the injected concentration in an induced fracture. Steidl also directly observed, in his mined-through studies, gel hanging in stringy clumps in many other induced fractures. As Willberg et al. (1997) noted, laboratory studies indicate that fingered flow of water past residual gel may impede fluid recovery. Therefore, some fracturing fluid gels appear not to flow with groundwater during production pumping and remain in the subsurface unrecovered. Such gels are unlikely to flow with groundwater during production, but may present a source of gel constituents to flowing groundwater during and after production.

Authorization of any future proposed projects, would require full compliance with local, state, and federal regulations and laws that relate to surface and groundwater protection and would be subject to routine inspections by the BLM and the Wyoming Oil and Gas Commission as described in Memorandum of Understanding WY920-94-09-79, dated September 21, 1994, prior to approval.

#### **GEOLOGIC HAZARDS (INCLUDING SEISMIC/LANDSLIDES)**

Potential geologic hazards caused by HF include induced seismic activity. Induced seismic activity could indirectly cause surficial landslide activity where soils/slopes are susceptible to failure.

Landslides involve the mass movement of earth materials down slopes and can include debris flows, soil creep, and slumping of large blocks of material. There are no identified landslides in the project area [Kemmerer RMP (2010), Pinedale RMP (2008), Green River RMP (1997), Rock Springs RMP Revision, and Rawlins RMP (2008) Chapter 2,

Earthquakes occur when energy is released due to blocks of the earth's crust moving along areas of weakness or faults. Earthquakes attributable to human activities are called "induced seismic events" or "induced earthquakes." In the past several years induced seismic events related to energy development projects have drawn heightened public attention. Although only a very small fraction of injection and extraction activities at hundreds of thousands of energy development sites in the United States have induced seismicity at levels that are noticeable to the public, seismic events caused by or likely related to energy development have been measured and felt in Alabama, Arkansas, California, Colorado, Illinois, Louisiana, Mississippi, Nebraska, Nevada, New Mexico, Ohio, Oklahoma, and Texas.

A study conducted by the National Academy of Sciences<sup>56</sup> studied the issue of induced seismic activity from energy development. As a result of the study, they found that: (1) the process of hydraulic fracturing a well as presently implemented for shale gas recovery does not pose a high risk for inducing felt seismic events; and (2) injection for disposal of waste water derived from energy technologies into the subsurface does pose some risk for induced seismicity, but very few events have been documented over the past several decades relative to the large number of disposal wells in operation.

The potential for induced seismicity cannot be made at the leasing stage; as such, it will be evaluated at the APD stage should the parcel be sold/issued, and a development proposal submitted.

#### **SPILL RESPONSE AND REPORTING**

Spill Prevention, Control, and Countermeasure (SPCC) - EPA's rules include requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires that operators of specific facilities prepare, amend, and implement SPCC Plans. The SPCC rule is part of the Oil Pollution Prevention regulation, which also includes the Facility Response Plan (FRP) rule. Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires the operator of these facilities to develop and implement SPCC Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C). In 1990, the Oil Pollution Act amended the Clean Water Act to require some oil storage facilities to prepare Facility Response Plans. On July 1, 1994, EPA finalized the revisions that direct facility owners or operators to prepare and submit plans for responding to a worst-case discharge of oil.

In addition to EPA's requirements, operators must provide a plan for managing waste materials, and for the safe containment of hazardous materials, per Onshore Order #1 with their APD proposal. All spills and/or undesirable events are managed in accordance with Notice to Lessee (NTL) 3-A and WY Information Memorandums 2008-028: *NTL- 3A Reporting Requirements* and 2009-021 *Guidance & Standards for Response to Oil & Gas-Related Spills & Clean-Up Criteria*. Regulations found at 43 CFR 3162.5(c) provide BLM with the necessary regulatory framework for responding to all spills and/or undesirable events related to hydraulic fracturing operations.

#### **PUBLIC HEALTH AND SAFETY**

The intensity, and likelihood, of potential impacts to public health and safety, and to the quality of usable water aquifers is directly related to proximity of the proposed action to domestic and/or community water supplies (wells, reservoirs, lakes, rivers, etc.) and/or agricultural developments. The potential impacts are also dependent on the extent of the production well's capture zone and well integrity. Standard Lease Notice No.1 specifies that development is generally restricted within a quarter mile of occupied dwellings and within 500 feet of riparian habitats and wetlands, perennial water sources (rivers, springs, water wells, etc.) and/or floodplains. Intensity of impact is likely dependent on the density of development. Further information related to the rate of development is provided in the Leasing Environmental Analysis under cumulative impacts.

---

<sup>56</sup> Induced Seismicity Potential in Energy Technologies, National Academy of Sciences, 2012

HF White Paper Table									
Field Office (Year of RFD)	Projected Number of CBM wells	Projected Number of Non-CBM/ Conventional Wells	Max Frac Volume CBM (gallons)	Total Est. H2O for CBM	Max Frac Volume Non_CBM (gallons)	Total Est. H2O for Non-CBM	Total Projected H2O for HF (gallons)	Total Projected H2O for HF (barrels)	Total Projected H2O for HF (acre- feet)
BFO (2012)	10,343	3,865	300,000	3,102,900,000	5,000,000	19,325,000,000	22,427,900,000	711,996,824	67,736.09
BHB (2010) (WFO/CYFO)	150	1,890	300,000	45,000,000	5,000,000	9,450,000,000	9,495,000,000	301,428,571	28,676.52
CFO (2005)	700	2,100	300,000	210,000,000	5,000,000	10,500,000,000	10,710,000,000	340,000,000	32,346.03
NFO (2004)	0	30	300,000	0	5,000,000	150,000,000	150,000,000	4,761,905	453.03
LFO (2009)	861	2,566	300,000	258,300,000	5,000,000	12,830,000,000	13,088,300,000	415,501,587	39,528.90
RFO (2004)	4,655	4,655	300,000	1,396,500,000	5,000,000	23,275,000,000	24,671,500,000	783,222,221	74,512.14
RSFO (GRRMP/1991)	300	1,258	300,000	90,000,000	5,000,000	6,290,000,000	6,380,000,000	202,539,682	19,268.69
RSFO (JMH/2002)	50	314	300,000	15,000,000	5,000,000	1,570,000,000	1,585,000,000	50,317,460	4,786.97
KFO (2006)	640	220	300,000	192,000,000	5,000,000	1,100,000,000	1,292,000,000	41,015,873	3,902.06
PFO (2006)	600	8,580	300,000	180,000,000	5,000,000	42,900,000,000	43,080,000,000	1,367,619,046	130,108.96
Total	18,299	25,478		5,489,700,000		127,390,000,000	132,879,700,000	4,218,403,168	401,319

Calculation assumes 100% of HF H2O is freshwater.

Conversion factor: gallons to barrels: \*0.0317460317 Conversion factor: barrels to acre feet: /10511.3365126

## 5.10 EA Preparers/Reviewers, Consultation & Coordination

The following individuals or organizations were involved in consultation on issues in the development of this EA.

### 5.10.1 Outside Agencies or Individuals

Prior to publication of this EA, letters were sent to landowners by the WSO notifying them that the minerals under their surface lands had been nominated for lease and inviting them to participate in the BLM's review. Of the initial 702 parcel nominated for sale, 452 appear to have at least some portion of the parcel in private fee ownership. Where surface ownership information was provided, the WSO mailed notification letters to each person's whose information was provided. No comments were received from these surface owners during the initial or extended comment period.

Informal scoping letters were also sent to Native American tribal contacts known or identified as having interest or concerns with oil and gas leasing in the area. No comments were received as a result of sending these letters. Tribal consultation was specifically initiated for parcel 323 in the Pinedale Field Office and this parcel is deferred from offering under State Director discretion.

When necessary, notice letters were sent to the Forest Service, Douglas Ranger District and to units of the National Park Service in the northeast regional area of Wyoming. The superintendent of the Fort Laramie National Historic Site has identified concerns with oil and gas development in proximity to the Historic Site for previous sales. Those concerns include activities within the visual setting of the area, effects on visitor experience, and impacts to air quality, water quality and night skies. These are impacts associated with lease development, and will be addressed site specifically if a development proposal is submitted. No new issues were identified that would suggest the need to consider alternatives beyond those being addressed in this EA and no specific comments were received from these entities.

In accordance with the BLM/WGFD Memorandum of Understanding WY131, Appendix 5G, the WSO sent the preliminary parcel list to the WGFD field personnel were provided an opportunity to review the revised preliminary parcel list and send their comments back to the BLM field office. If WGFD field personnel did not have any comments or concerns with the revised preliminary parcel list, they sent an email/letter to the BLM field office that they have reviewed the revised preliminary parcel list, and the WGFD concerns have been met and they have no additional concerns. The BLM field offices reviewed WGFD field personnel concerns and addressed any concerns. The WSO also routinely meets with WGFD Habitat Protection Program personnel as a part of its coordination on oil and gas lease sales. Individuals contacted at the WGFD regarding the subject parcels include: Brandon Scurlock (PFO and RSFO), Sam Stephens (RFO), Jeff Short (KFO), Erika Peckham, Cheyenne Stewart and Tim Thomas (BFO); Willow Hibbs and Heather O'Brien (CFO); Joe Sandrini, Erika Peckham and Willow Bish (NFO); Leslie Schreiber (WFO); and Angela Bruce, Rick Huber, and Scott Smith (Cheyenne WGFD/Statewide).

Under procedures outlined in a memorandum of understanding, the BLM requested comments from the Bureau of Reclamation (BOR) as the surface management agency on any parcels located on lands managed by the BOR. This coordination is also discussed under Scoping, in section 1.6 on page 1.6 of this EA.

### 5.10.2 BLM-Wyoming State Office

Name	Title	Responsible for
<b>BLM Wyoming State Office</b>		
Erik Norelius	Natural Resource Specialist	Project Manager and Preparer
Ryan McCammon	Physical Scientist, Air Quality	Air Quality & Climate Change
Brad Jost	Wildlife Biologist	Wildlife
Jessica L. Montag	Regional Socio-Economist	Socioeconomics
Jenn Dobb	Economist	Socioeconomics

### 5.10.3 BLM-High Desert District

Name	Title	Responsible for
<b>High Desert District Office</b>		
Sonja Hunt	HDD Resource Advisor-Energy	District Project Coordinator
<b>Pinedale Field Office</b>		
Douglas Linn	Assistant Field Manager	Lands and Minerals
Brian Roberts	Natural Resource Specialist	Soils
Theresa Gulbrandson	Wildlife Biologist	Wildlife, Threatened and Endangered Species, Special Status species
Brigid Grund	Cultural Resources Specialist	Cultural Resources, Paleontology
Kellie Roadifer	Lead Project Coordinator	Project Lead
Joel Klosterman	Outdoor Recreation Planner	Recreation; VRM; LWCs
<b>Rawlins Field Office</b>		
Ray Ogle	Supervisory Natural Resource Specialist	RFO Lead
Natasha Keierleber	Archeologist	Cultural Resources, Paleontology
Frank Blomquist	Wildlife Biologist	Wildlife, Threatened and Endangered Species, Special Status species
Michael Mischke	Wildlife Biologist	Wildlife, Threatened and Endangered Species, Special Status species
Ernie Johnson	Geologist	Geology; minerals
Andy Mowrey	Recreation Specialist	Recreation and VRM
<b>Rock Springs Field Office</b>		
Ted Inman	Supervisory Natural Resource Specialist/ Acting Assistant Field Manager, Land and Minerals	RSFO Lead
Scott Stadler	Supervisory Archeologist	Cultural Resources
Gene Smith	Paleontology Coordinator	Paleontology
Mark Snyder	Supervisory Wildlife Biologist	Wildlife, Threatened and Endangered Species, Special Status species
Storie Ratcliff	Natural Resource Specialist	Minerals
TJ Franklin	Natural Resource Specialist	Minerals
Jo Foster	Recreation Specialist	Recreation; VRM; LWCs

### 5.10.4 BLM High Plains District

Name	Title	Responsible for
Kathleen Lacko	High Plains District Office, Planning and Environmental Coordinator	Overall Coordination/ District Project Lead
Andrea Meeks	High Plains District, Solid Mineral Specialist	Coal Group Reviews
Debby Green	Buffalo Field Office, Natural Resource Specialist (NRS)	Buffalo Field Office Lead, Core Team NRS
G.L. "Buck"	Buffalo Field Office, Lead	Core Team Archaeologist, Cultural Resources,

Damone III	Archaeologist	Paleontology
Tom Berdan	Casper Field Office, Wildlife Biologist	Wildlife, Threatened and Endangered Species and Special Status Species
Patrick Walker	Casper Field Office, Archaeologist	Cultural Resources, Paleontology
Eric Schnell	Newcastle Field Office, Physical Scientist.	Newcastle Field Office Lead
Justin Proffer	Newcastle Field Office, Wildlife Biologist	Core Team Wildlife Biologist, Newcastle Field Office Reviews and Special Status Species
Alice Tratebas	Newcastle Field Office, Archaeologist	Archaeology, Paleontology
Diane Adams	Buffalo Field Office, GIS Specialist	GIS and Mapping, Field visits
Don Brewer	Buffalo Field Office, Wildlife Biologist	Buffalo Field Office Wildlife Review
Wyatt Wittkop	Buffalo Field Office, Wildlife Biologist	Buffalo Field Office Wildlife Review

#### 5.10.5 BLM-Wind River/Bighorn Basin District

Name	Title	Responsible for
<b>Wind River/Bighorn Basin District Office</b>		
Rita Allen	WR/BBD District Resource Advisor	District Project Manager & Preparer
Holly Elliott	Planning and Environmental Coordinator	Core Team Lead; Review
<b>Cody Field Office</b>		
Brandi Hecker	Natural Resource Specialist	CYFO Core Team Lead; Site Visits
Gretchen Hurley	Geologist	Geology and Paleontological Resources
Abel Guevara	Wildlife Biologist	Wildlife/T&E
Destin Harrell	Wildlife Biologist	Wildlife/T&E
Kiersen Crume	Archeologist	Cultural
Rick Tryder	Outdoor Recreation Planner	Recreation/VRM//Wilderness
Alicia Hummel	Rangeland Management Specialist	Grazing
Justin Wilson	Graphic Information Specialist	Mapping
<b>Worland Field Office</b>		
Darci Stafford	Natural Resource Specialist	Review and Site Visits
Ted Igleheart	Wildlife Biologist	Wildlife/T&E
Tim Stephens	Wildlife Biologist	Wildlife/T&E
Marit Bovee	Archaeologist	Cultural and Paleontological Resources
Stacey Moore	Archaeologist	Cultural and Paleontological Resources
Hanna Fortney	Outdoor Recreation Planner	Recreation/VRM/Wilderness
Karen Hepp	Range Management Specialist	T&E Plants
Jeff Coyle	Hydrologist	Hydrology, water resources

## 5.11 References

2017 Federal Land Manager Environmental Data base

<http://views.cira.colostate.edu/fed/AqrvMenu.aspx>

40 Code of Federal Regulations (CFR), Protection of Environment

<https://www.gpo.gov/>

43 Code of Federal Regulations (CFR), Public Lands: Interior

<https://www.gpo.gov/>

American Meteorological Society (AMS). 2017. State of the Climate in 2017.

Berger, Dr. Joel, et al. 2008. "Wildlife and Energy Development, Pronghorn of the Upper Green River Basin-Year 3 Summary," Wildlife Conservation Society, July 2008.

Carr, N.B., and Melcher, C.P., eds., 2015, Wyoming Basin Rapid Ecoregional Assessment: U.S. Geological Survey Open-File Report 2015-1155, 896 p., <http://dx.doi.org/10.3133/ofr20151155>.

Colorado Environmental Coalition, et al., IBLA 96-243, decided June 10, 1999.

Colorado State University, VIEWS 2.0. 2014. VIEWS Data Wizard. Available online:

<http://views.cira.colostate.edu/web/DataWizard/>.

Corner, A., Lewandowsky, S., Phillips, M. and Roberts, O. (2015). The uncertainty handbook - A practical guide for climate change communicators. Bristol: University of Bristol.

CRCT Conservation Team. 2006. Conservation agreement for Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) in the States of Colorado, Utah, and Wyoming. Colorado Division of Wildlife, Fort Collins. 10pp.

Council on Environmental Quality (CEQ). Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effect of Climate Change in National Environmental Policy Act Reviews. Council of Environmental Quality, August 1, 2016.

Dietz, T. (2013). Bringing values and deliberation to science communication. Proceedings of the National Academy of Sciences (PNAS) 110(3): 14081-14087.

EIA, 2009. Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009. U.S. Energy Information Administration (EIA). August 4.

[https://www.eia.gov/analysis/requests/2009/hr2454/pdf/sroiaf\(2009\)05.pdf](https://www.eia.gov/analysis/requests/2009/hr2454/pdf/sroiaf(2009)05.pdf)

EIA, 2019, Annual Energy Outlook 2019, with projections to 2050, U.S. Energy Information Administration (EIA). January 24.

Etkin, D. and Ho, E. (2007). Climate change: Perceptions and discourses of risk. Journal of Risk Research 10(5): 623-641.

Executive Order 11988--Floodplain management. 1977. Source: The provisions of Executive Order 11988 of May 24, 1977, appear at 42 FR 26951, 3 CFR, 1977 Comp., p. 117, unless otherwise noted.

Feeney et al. 2004. "Big Game Migration Corridors in Wyoming." Figure 1. University of Wyoming.

Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland. 2007. Changes in Atmospheric Constituents

and in Radiative Forcing. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Goddard Institute for Space Studies. 2007. Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots. New York, New York. (Available on the Internet: <http://data.giss.nasa.gov/gistemp/graphs/fig.B.lrg.gif>).

Hayes, D. J., R. Vargas, S. R. Alin, R. T. Conant, L. R. Hutyrá, A. R. Jacobson, W. A. Kurz, S. Liu, A. D. McGuire, B. Poulter, and C. W. Woodall. 2018. Chapter 2: The North American carbon budget. In *Second State of the Carbon Cycle Report (SOCCR2): A Sustained Assessment Report* [Cavallaro, N., G. Shrestha, R. Birdsey, M. A. Mayes, R. G. Najjar, S. C. Reed, P. Romero-Lankao, and Z. Zhu (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 71-108, <https://doi.org/10.7930/SOCCR2.2018.Ch2>.

Holloran, M. J. 2005. "Greater Sage-Grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming." PhD Dissertation. University of Wyoming. Laramie, Wyoming. 211 pp.

Intergovernmental Panel on Climate Change (IPCC). 2018. Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

Intergovernmental Panel on Climate Change (IPCC). 2014. "Climate Change 2014: Synthesis Report. Of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change" [Core Writing Team, Pachauri, R.K and Meyer, L. (eds.)]. Intergovernmental Panel on Climate Change, Geneva, Switzerland, 139 pp.

Intergovernmental Panel on Climate Change (IPCC). 2007. "Climate Change 2007: The Physical Basis (Summary for Policymakers)." Cambridge University Press. Cambridge, England and New York, New York. (Available on the Internet: <http://www.ipcc.ch/pdf/assessment-report/ar4/wgl/ar4-wgl-spm.pdf>).

Kotchen, M.J. 2011. Cost-benefit analysis. Chapter in: Encyclopedia of climate and weather, Second edition. Schneider, S.H., editor-in-chief. New York, Oxford University Press: pp 312-315.

Lukas, J., Barsugli, J., Doesken, N., Rangwala, I., and K. Wolter (2014). Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation. A report for the Colorado Water Conservation Board by the Western Water Assessment. 114 pp.

Merrill, M.D., Sleeter, B.M., Freeman, P.A., Liu, J., Warwick, P.D., and Reed, B.C. 2018. Federal lands greenhouse gas emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131, 31 p., <https://doi.org/10.3133/sir20185131>.

National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. (Available on the Internet: <http://dels.nas.edu/basc/Climate-HIGH.pdf>).

National Agricultural Statistics Service (NASS). 2007. County profile. [http://www.agcensus.usda.gov/Publications/2007/Online\\_Highlights/County\\_Profiles/Wyoming/index.asp](http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Wyoming/index.asp)

National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA). 2019. <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature> (accessed 04/05/2019).

- National Research Council. (2010). Informing an effective response to climate change: Washington D.C., The National Academies Press.
- National Research Council. (2009). Informing decisions in a changing climate: Washington D.C., The National Academies Press.
- N.M ex rel. Richardson v. BLM, 565 F.3d 683, 718-19 (10th Cir. 2009).
- Outdoor Industry Foundation. 2006. "The Active Outdoor Recreation Economy." [www.outdoorindustryfoundation.org](http://www.outdoorindustryfoundation.org)
- Park County Resource Council, Inc. v. U.S. Department of Agriculture, 10th Cir., April 17, 1987.
- Powell, Jacob. 2003. "Distribution, Habitat Use Patterns, and Elk Response to Human Disturbance in the Jack Morrow Hills, Wyoming." May 2003. M.S., Department of Zoology and Physiology, University of Wyoming).
- Ramanathan V. and G. Carmichael. 2008. Global and regional climate changes due to black carbon. *Nature Geoscience*. 1, pp. 221-227.
- Sawyer, Hall, et al. 2011. Final report for Atlantic Rim Mule Deer Study; Phase 2. Western Ecosystem Technology, Inc. Cheyenne, Wyoming.
- Sawyer, Hall, et al. 2010. September 2010, Mule Deer Monitoring in the Pinedale Anticline Project Area: 2010 Annual Report.
- Sawyer, Hall, et al. 2004. 2004 SUBLETTE MULE DEER STUDY (PHASE II): Long-term monitoring plan to assess potential impacts of energy development on mule deer in the Pinedale Anticline Project Area.
- Semlitsch, Raymond D. and Bodie, J. Russell. 2003. "Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles," IN *Conservation Biology* Volume 17, No. 5, October 2003.
- Thaeler, C. S., Jr. 1972. Taxonomic status of the pocket gophers, *Thomomys idahoensis* and *Thomomys pygmaeus* (Rodentia-Geomyidae). *Journal of Mammalogy* 53:417-428.
- Trewartha GT, Horn LH. 1980. Introduction to Climate, 5th edn. McGraw Hill, New York, NY
- U.S. Bureau of Economic Analysis (BEA). 2017a. Table CA5N. Personal Income by Major Component and Earnings by Industry. <https://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=7#reqid=70&step=1&isuri=1> (accessed May 21, 2018).
- U.S. Bureau of Economic Analysis (BEA). 2017b. Table CA25N. Total Full-Time and Part-Time Employment by Industry. <https://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=7#reqid=70&step=1&isuri=1> (accessed May 21, 2018).
- U.S. Bureau of Economic Analysis (BEA). 2012. Table CA25N\_WY. November 26, 2012 revised data (most current). <http://www.bea.gov/regional/histdata/releases/1112lapi/index.cfm>, Downloaded 4-4-2014.
- U.S. Bureau of Economic Analysis (BEA). 2012a. Table CA25N: Total full-time and part-time employment by NAICS industry. <http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=5>
- U.S. Bureau of Economic Analysis (BEA). 2012b. Regional definitions. <http://www.bea.gov/regional/definitions/nextpage.cfm?key=Private nonfarm employment>

U.S. Census Bureau, 2010a. 2010 Census Urban and Rural Classification and Urban Area Criteria.  
<http://www.census.gov/geo/www/ua/2010urbanruralclass.html>

U.S. Census Bureau 2010b. Table DP-1 Geography-Campbell County, Converse County, Crook County, Goshen County, Natrona County, Niobrara County, Weston County.

U.S. Department of the Interior. 2013. "Department of the Interior's 2012 Economic Contributions." July 2013.

U.S. Department of the Interior, Bureau of Land Management. 2016. Instruction Memorandum WY-2016-024, dated August 15, 2016, "Greater Sage-grouse Habitat Management Policy on Bureau of Land Management (BLM) Wyoming Administered Public Lands Including the Federal Mineral Estate." Cheyenne, Wyoming

U.S. Department of the Interior Bureau of Land Management. 2016. Instruction Memorandum WO-2016-143, dated September 1, 2016, "Implementation of the Greater Sage-Grouse Resource Management Plan Revisions or Amendments – Oil & Gas Leasing and Development Sequential Prioritization." Washington D.C.

U.S. Department of the Interior, Bureau of Land Management. 2015. Lander Field Office, Post ROD RMP Maintenance Actions.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=28453>

U.S. Department of the Interior, Bureau of Land Management. 2015. Bighorn Basin Proposed Resource Management Plan and Final Environmental Impact Statement, May 28, 2015. U.S. Department of the Interior, Bureau of Land Management, Wyoming.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=19107>

U.S. Department of the Interior, Bureau of Land Management. 2015. Rocky Mountain Region Record of Decision and Approved Resource Management Plan for the Worland Field Office Planning Area. U.S. Department of the Interior, Bureau of Land Management, Wyoming.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=19107>

U.S. Department of the Interior, Bureau of Land Management. 2015. Rocky Mountain Region Record of Decision and Approved Resource Management Plan for the Cody Field Office Planning Area. U.S. Department of the Interior, Bureau of Land Management, Wyoming.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=19107>

U.S. Department of the Interior, Bureau of Land Management. 2015. "Record of Decision and Bureau of Land Management Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs Field Offices Approved Resource Management Plan Amendment for Greater Sage-Grouse. Cheyenne, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2015. Rawlins Field Office, RMP Amendments.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=88584>

U.S. Department of the Interior, Bureau of Land Management. 2014. Record of Decision and Approved Resource Management Plan for the Lander Field Office Planning Area. U.S. Department of the Interior, Bureau of Land Management, Wyoming.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=28453>

U.S. Department of the Interior, Bureau of Land Management. 2014. BLM Sensitive Species. Cheyenne, Wyoming.  
<http://www.blm.gov/wy/st/en/programs/pcp/species/sensitive.html>

U.S. Department of the Interior, Bureau of Land Management. 2013. Handbook 1624-1, Planning For Fluid Mineral Resources, U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
[https://www.blm.gov/sites/blm.gov/files/uploads/Media\\_Library\\_BLM\\_Policy\\_Handbook\\_H\\_1624\\_1.pdf](https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_Handbook_H_1624_1.pdf)

U.S. Department of the Interior, Bureau of Land Management. 2013. Handbook H-3120-1, Competitive Leases (P), U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
[https://www.blm.gov/sites/blm.gov/files/uploads/Media\\_Library\\_BLM\\_Policy\\_h3120.pdf](https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h3120.pdf)

U.S. Department of the Interior, Bureau of Land Management. 2013. Proposed Resource Management Plan and Final Environmental Impact Statement for the Lander Field Office Planning Area, February 22, 2013 (two volumes). U.S. Department of the Interior, Bureau of Land Management, Wyoming.  
<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=28453>

U.S. Department of the Interior, Bureau of Land Management. 2010. Instruction Memorandum No. WO-2010-117, Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
<https://www.blm.gov/policy/im-2010-117-1>

U.S. Department of the Interior, Bureau of Land Management. 2010b. Kemmerer Approved Resource Management Plan and Record of Decision. Kemmerer, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2009a. Instruction Memorandum WY-2010-012, dated December 29, 2009, “Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands including the Federal Mineral Estate.” Cheyenne, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2009. Washington Office Instruction Memorandum 2009-184, Courtesy Notification of Surface Owners When Split Estate Lands are Included in an Oil and Gas Notice of Competitive Lease Sale  
<https://www.blm.gov/policy/im-2009-184>

U.S. Department of the Interior, Bureau of Land Management. 2009. Instruction Memorandum No. WO-2009-215, Planning for Special Designations within the National System of Public Lands. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
<https://www.blm.gov/policy/im-2009-215>

U.S. Department of the Interior, Bureau of Land Management. 2008. Handbook 1790-1, National Environmental Policy Act Handbook. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
[https://www.blm.gov/sites/blm.gov/files/uploads/Media\\_Library\\_BLM\\_Policy\\_Handbook\\_h1790-1.pdf](https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_Handbook_h1790-1.pdf)

U.S. Department of the Interior, Bureau of Land Management. 2008. “Kemmerer Proposed Resource Management Plan and Final Environmental Impact Statement.” Kemmerer, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. “Pinedale Proposed Resource Management Plan and Final Environmental Impact Statement.” Pinedale, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. Rawlins Field Office Approved Resource Management Plan and Record of Decision, U.S. Department of the Interior, Bureau of Land Management, Wyoming.  
<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=88584>

U.S. Department of the Interior, Bureau of Land Management. 2008. Rawlins Field Office Proposed Resource Management Plan and Final Environmental Impact Statement, U.S. Department of the Interior, Bureau of Land Management, Wyoming.

<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=88584>

U.S. Department of the Interior, Bureau of Land Management. 2005. Handbook 1601-1, Land Use Planning Handbook. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
[https://www.blm.gov/sites/blm.gov/files/uploads/Media\\_Library\\_BLM\\_Policy\\_Handbook\\_h1601-1.pdf](https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_Handbook_h1601-1.pdf)

U.S. Department of the Interior, Bureau of Land Management. 2005a. Final Statewide Programmatic Biological Assessment: Black-footed Ferret (*Mustela nigripes*). Submitted to U.S. Department of Interior, Bureau of Land Management. Wyoming State Office. Cheyenne, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2004. Handbook 8120-1, General Procedural Guidance for Native American Consultation (Public). U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
[https://www.blm.gov/sites/blm.gov/files/uploads/Media\\_Library\\_BLM\\_Policy\\_H-8120-1.pdf](https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_H-8120-1.pdf)

U.S. Department of the Interior, Bureau of Land Management. 1996. Green River Proposed Resource Management Plan and Final Environmental Impact Statement.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

U.S. Environmental Protection Agency (EPA). 2019. Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2017. Available online: <https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf>

U.S. Environmental Protection Agency (EPA). 2018. 2011-2017 Greenhouse Gas Reporting Program, Industrial Profile: Petroleum and Natural Gas Systems, October. Retrieved from:  
[https://www.epa.gov/sites/production/files/2018-10/documents/subpart\\_w\\_2017\\_industrial\\_profile.pdf](https://www.epa.gov/sites/production/files/2018-10/documents/subpart_w_2017_industrial_profile.pdf)

U.S. Environmental Protection Agency (EPA). 2018. Natural Gas Star Program (2017 data) Environmental Protection Agency, Washington, D.C.  
Available online: <https://www.epa.gov/natural-gas-star-program/natural-gas-star-program-accomplishments>

U.S. Environmental Protection Agency (EPA). (2016h). Understanding global warming potentials. Retrieved from <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>

U.S. Environmental Protection Agency, February 2, 2016, Greenhouse Gas Equivalencies Calculator, <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>.

U.S. Environmental Protection Agency (EPA). 2014. Air Data, Monitor Values Report. Available online: [http://www.epa.gov/airdata/ad\\_rep\\_mon.html](http://www.epa.gov/airdata/ad_rep_mon.html)

U.S. Environmental Protection Agency (EPA). 2012a. National Ambient Air Quality Standards (NAAQS). Available online: <http://www.epa.gov/air/criteria.html>

U.S. Environmental Protection Agency (EPA). 2006. Natural Gas Star Program (2006 data) at: <http://www.epa.gov/gasstar/accomplish.htm>. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2003a. Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule. EPA-454/B-03-005. Available online: [http://www.epa.gov/ttncaal/t1/memoranda/rh\\_envcurhr\\_gd.pdf](http://www.epa.gov/ttncaal/t1/memoranda/rh_envcurhr_gd.pdf)

U.S. Environmental Protection Agency (EPA). 2012a. National Ambient Air Quality Standards (NAAQS). Available online: <http://www.epa.gov/air/criteria.html>.

U.S. Environmental Protection Agency (EPA). 2014. Air Data, Monitor Values Report. Available online: [http://www.epa.gov/airdata/ad\\_rep\\_mon.html](http://www.epa.gov/airdata/ad_rep_mon.html).

United States Global Change Research Program (USGCR). 2017: *Climate Science Special Report: Fourth National Climate Assessment*, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp., doi: 10.7930/J0J964J6.

United States Government Accountability Office. 2012. "OIL AND GAS, Information on Shale Resources, Development, and Environmental and Public Health Risks", GAO-12-732.

University of Wyoming. School of Energy Resources and Haub School & Ruckelshaus Institute. 2012 Hydraulic Fracturing: A Wyoming Energy Forum Summary Report.

URS Corporation. 2010. Climate change supplementary information report, Montana, North Dakota and South Dakota Bureau of Land Management. Denver, CO. Retrieved from [http://www.blm.gov/mt/st/en/prog/energy/oil\\_and\\_gas/leasing/leasingEAs.html](http://www.blm.gov/mt/st/en/prog/energy/oil_and_gas/leasing/leasingEAs.html)

Watson P., Wilson, J, Thilmany, D., and Winter, S. 2007. Determining economic contributions and impacts: What is the difference and why do we care? JRAP 37(2):1-15.

Wyoming Department of Environmental Quality;  
[http://deq.wyoming.gov/media/attachments/Water%20Quality/Pavillion%20Investigation/Investigation%20Final%20Report/03\\_Fact-Sheet-for-the-Pavillion-Wyoming-Area-Domestic-Water-Wells-Final-%20Report.pdf](http://deq.wyoming.gov/media/attachments/Water%20Quality/Pavillion%20Investigation/Investigation%20Final%20Report/03_Fact-Sheet-for-the-Pavillion-Wyoming-Area-Domestic-Water-Wells-Final-%20Report.pdf)

Wyoming Game and Fish Department. 2010. "Recommendations for Development of Oil and Gas Resources within Crucial and Important Habitat." Cheyenne, Wyoming.

Wyoming Game and Fish Department. 2013. "2013 Annual report." Cheyenne, Wyoming.

Wyoming Game and Fish Department. 2017. Sage-Grouse Job Completion Report 2017, June 2017 – May 2018. Cheyenne, Wyoming.

Wyoming Game and Fish Department. 2019. Big Game Job Completion Reports. Cheyenne, Wyoming.

WOGCC (Wyoming Oil and Gas Conservation Commission), 2012. 2011 County Report as reported on 12/13/2012. <http://wogcc.state.wy.us/CountyReport.CFM>

### **Additional References**

BLM Competitive Oil & Gas Leasing  
<https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing>

2017 Wyoming BLM Competitive Oil & Gas Leasing Environmental Assessment Documents  
<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=94042>

BLM 2017. Webpage: Leasing and Management of Split Estate. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
<https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/split-estate>

BLM 2017. Webpage: Split Estate. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.  
<https://www.blm.gov/programs/energy-and-minerals/mining-and-minerals/split-estate>

BLM 2007. Split Estate – Rights, Responsibilities, and Opportunities. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.

<https://www.blm.gov/documents/national-office/public-room-blm-library/brochure/split-estate-rights-responsibilities-and>

BLM 2008. Cultural Resource Requirements on Private Surface-Federal Minerals for Oil and Gas Development. U.S. Department of the Interior, Bureau of Land Management. Washington, D.C.

<https://www.blm.gov/documents/national-office/blm-library/brochure/split-estate-cultural-resource-requirements-private>

BLM, General Land Office. The Official Federal Land Records Site, provides live access to federal land conveyance records for the Public Land States. U.S. DOI, BLM, Washington, D.C.

<http://www.glorerecords.blm.gov/default.aspx>

2015 State of Wyoming Executive Order Greater Sage-grouse Core Area of Protection (EO 2015-4) (Wyoming Office of the Governor 2015)

[https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Sage%20Grouse/SG\\_Executive\\_Order.pdf](https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Sage%20Grouse/SG_Executive_Order.pdf)

2017 Website: Wyoming Game and Fish Department

<https://wgfd.wyo.gov/Habitat/Sage-Grouse-Management>

EPA

<http://www.epa.gov/airdata>

<https://www.epa.gov/castnet>

<https://www.epa.gov/aboutepa/epa-region-8-mountains-and-plains>

<https://www.epa.gov/air-trends>

<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Wyoming

<http://wyvisnet.com/Data/Reports.aspx>

Department of the Interior

<https://www.doi.gov/climate>